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SOUTHERN CALIFORNIA INDEPENDENT SPORT FISHING SURVEY
ANNUAL REPORT NO. 2

by

Vickie Wine

MARINE RESOURCES

Administrative Report No. 78-2

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SOUTHERN CALIFORNIA INDEPENDENT SPORT FISHING SURVEY
ANNUAL REPORT NO. 2

JULY 1, 1976 - JUNE 30, 1977[1/]

by
Vickie Wine[2/]

ABSTRACT

For the second consecutive year, a program of random field sampling of anglers and divers fishing from privately owned boats was conducted at southern California launch ramps, hoists, and boat rental facilities. This study presents quantitative data and statistical estimates of effort, total catch, catch of preferred sport fish species, and length frequencies of particular species landed by private boat sport fishermen. An assessment of sport fishermen's compliance with current fishing regulations is also included.

Catch composition and effort levels varied considerably among the five counties sampled, reflecting differences in water temperature, offshore habitat, and preferences for particular species by local fishermen. A comparison of this year's results with those of last year showed that although catch rates for some species were similar both years, others diverged considerably.

1/ Marine Resources Region, Administrative Report No. 78-2, January 1978.

2/ Marine Resources Region, California State Fisheries Laboratory, 350 Golden Shore, Long Beach, California 90802

ACKNOWLEDGMENT

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Twenty-four seasonal aids participated in the collection of data for this survey, and I should like to thank each one for his or her contribution to the project. I also wish to thank David Ono and John Duffy who were responsible for training and supervising the samplers in the Santa Barbara and San Diego areas respectively. Therese Hoban assisted in the training of seasonal aids in the Los Angeles-Orange County area, and Gene Witeck designed the statistical methodology for the catch and effort estimates. Special thanks are extended to Eugene Fleming for statistical analysis, computer programming, and program debugging and to Eric Knaggs for aid in project planning. Herb Frey made editorial suggestions, and Charel Cueva typed the manuscript.

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INTRODUCTION

The second year of the Southern California Independent Sport Fishing Survey was conducted from July 1, 1976 to June 30, 1977 by the California Department of Fish and Game in cooperation with the National Marine Fisheries Service. The purposes of the study were 1) to estimate effort levels expended by sport anglers and divers fishing from privately owned boats, 2) to estimate the magnitude and species composition of the catch by these fishermen, and 3) to assess the degree of sport fishermen's compliance with size limit regulations. This information provides an indication of the impact of private boat sport fishermen on southern California'a marine resources and can be used to evaluate and to suggest modifications of current sport fish management plans.

OPERATIONS

Sampling Plan

The sampling plan consisted of a program of random field sampling at the major launch ramps, hoists, and boat rental locations from Santa Barbara to San Diego Counties. Sampling was conducted on all weekends and holidays and on ramdomly chosen weekdays in accordance with available manpower. Field samplers remained at the sampling locations from 1000 to 1800 hours, and an effort was made to interview all returning anglers and divers. Information on length of fishing trip, number of poles used, and number of people angling or diving was gathered along with the identification of all fishes, molluscs, crustaceans, and echinoderms in possession (no data were requested about species caught but not kept). An attempt was made to measure all species with legal size requirements. Eight other species were also measured to provide data for life history studies.

Three months into the sampling year it became apparent that we had to cut back our sampling effort. It was decided to curtail sampling during the winter months. Therefore, from October 1976 through March 1977, weekends were sampled as usual but no weekdays were sampled in Santa Barbara, Ventura, and San Diego Counties. Minimal weekday sampling was carried out in Los Angeles and Orange Counties during this period. Consequently, catch and effort estimates for all of southern California could not be made for weekdays during one-half of the sample year. However, adjusted estimates were made based on sample data gathered during the winter of the 1975-76 Independent Sport Fishing Survey and added to this year's estimates.

Sampling Locations

Sampling sites were located in Santa Barbara, Ventura, Los Angeles, Orange, and San Diego Counties (Figure 1). During the year we sampled 18 launch ramps, 5 boat hoists, and 5 boat rental locations. Three locations have both a rental facility and a boat hoist, and one location has a hoist and a launch ramp.

All launch ramps in Santa Barbara, Ventura, Los Angeles, and Orange Counties were sampled. In San Diego County, eight of the twelve existing ramps were sampled. The four unsampled locations are used almost exclusively by small sailboats and were therefore not included in the sampling plan. Many boat hoists in the sample region are used mainly by sailboats or in conjunction with boat repair facilities or dry storage areas. Only those boat hoists and skiff rentals which are used frequently by fishermen were sampled.

Statistical Analysis

The sampling population consisted of launch-ramp-days-of-fishing-activity for each management-unit month: in other words, the fishing

activity at one launch ramp in one management unit during 1 day of a month represented one sampling unit. The three management units consisted of the sample locations in Santa Barbara-Ventura Counties, Los Angeles-Orange Counties, and San Diego County. The launch ramp days were divided into two groups: 1) weekdays, which were chosen randomly and with replacement, and were dependent on available manpower; and 2) weekends, which included all Saturdays, Sundays, and holidays, each of which was sampled at least once in each management unit. The launch ramps sampled during any 1 day were also chosen randomly but without replacement.

Monthly estimates and variances of the number of angling parties, diving parties, anglers, divers, angler-trip-hours, diver-trip-hours, total angler catch, total diver catch, angler rockfish catch, diver rockfish catch, and catch of selected species by anglers or divers were determined separately for weekends and weekdays for each management unit. The yearly and quarterly estimates were sums of monthly estimates.

Estimates of weekday catch and effort values for Santa Barbara-Ventura Counties and San Diego County were made using ratios obtained from the 1975-76 Independent Sport Fishing Survey data. It was first determined what proportion of the 1975-76 estimated total weekday catch or effort was represented by the October-March estimates. This proportion was then used to expand the 1976-77 estimates. For instance, if the number of estimated weekday anglers in San Diego County between October and March represented 31% of that year's total weekday anglers, it was assumed that the missing portion of the 1976-77 data also represented 31% of the total.

RESULTS AND DISCUSSION

During the year the 28 sample locations were sampled a total of 972 times. We interviewed 60,998 anglers and 3,874 divers who expended 411,042

angler-trip-hours [3/] and 20, 693 diver-trip-hours [3/] respectively. These fishermen landed 152,553 fishes, molluscs, crustaceans, and echinoderms of 192 identified species (Tables 1 and 2). They also landed 6,994 filleted fishes whose species could be identified.

Effort

The unit of effort in this report reflects the entire amount of time spent on a fishing trip, not just the time spent angling or diving. Reliable estimates of actual angling or diving time could not be determined from the fishermen; therefore length of fishing trip was used as the time measurement from which the effort unit was derived. The effort unit is thus an angler-trip-hour or a diver-trip-hour.

Angler effort levels were highest during the summer vacation season, from mid-June through early September. Good fishing weather and the availability of surface fish species attracted many vacationing fishermen to the area and also brought out the local resident fishermen. After Labor Day weekend angler effort slacked off considerably--down to less than one-half the summertime level.

A warm water mass moved into the southern California coastal area during late summer and remained until early spring. This resulted in the appearance of surface fishes and other warm water species which would not normally have been available at this time of year. The presence of these fishes and mild weather conditions effected an increase in angling effort. In the Santa Barbara-Ventura area however, it was not the warm water which caused droves of anglers to venture out onto the briny blue, it was the seasonal appearance of salmon, *Oncorhynchus* spp., which caused the effort level to rise to 40% higher than the preceeding summer-

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3/ The unit of effort is one hour of trip time per angler or diver. Adjustments were made for those using more than one fishing pole concurrently.

time level for this region. In the four other counties effort levels ranged from one-half to two-thirds of the summertime levels. When springtime upwelling began in March, water temperatures became somewhat colder than normal and remained below normal throughout spring and early summer. Angling effort increased slightly during this time but did not match last year's (1975-76) April-June effort level.

Diving effort was greatest in October when lobster, *Panulirus interruptus*, season opened. Effort levels then declined during the winter months. One reason for the decrease in activity was that the abalone, *Haliotis* sp., season was closed from mid-January to mid-March, and when the season reopened a large section of coastline (from Palos Verdes Pt. in Los Angeles County to Dana Pt. in Orange County) was closed to both sport and commercial abalone fishermen. Effort levels began to rise steadily during the spring.

Throughout the year Los Angeles and Orange Counties had the most heavily used facilities by anglers. Dana Pt. launch ramp in Orange County was the most popularly used facility in the entire sample area, sometimes having almost 200 fishing boats launched in a single day. Diver activity was greatest in San Diego and Santa Barbara-Ventura Counties.

Of the three types of facilities sampled, launch ramps received the vast majority of use. Boat hoists were used primarily where ramps were not available. Skiff rentals had a small number of boats for hire and had limited use; they were rarely used by divers.

Angler Catch

A great variety of species was landed during the year: 181 species of fishes, molluscs, crustaceans, and echinoderms were identified. Of these species, 49 composed 95% of the identified angler catch, with the remaining 5% represented by 132 species. Over one-half of the identified

catch was composed of only eight species: 1) white croaker, *Genyonemus lineatus*, 26%; 2) Pacific bonito, *Sarda chiliensis*, 7%; 3) kelp bass, *Paralabrax clathratus*, 6%; 4) olive rockfish, *Sebastes serranoides*, 5%; 5) barred sand bass, *Paralabrax nebulifer*, 4%; 6) bocaccio, *Sebastes paucispinis*, 4%; 7) Pacific mackerel, *Scomber japonicus*, 3%; and 8) copper rockfish, *Sebastes caurinus*, 3%. The rockfishes, *Sebastes* spp., were well represented by 48 species which contributed 31% of the identified catch.

The 1976-77 Sport Fishing Regulations allowed certain fishes to be landed in filleted form provided that the fillets met size limit requirements and could be identified. However, during the survey we encountered many filleted fishes which were unidentifiable: 660 filleted fishes and 6,334 filleted rockfishes could not be identified by species.

Seasonal Variations

Species composition of the catch varied between seasons. During the summer, warm water species were abundant. California barracuda, *Sphyraena argentea;* bass, *Paralabrax* spp.; and bonito were prevalent in the southern counties (San Diego, Orange, and Los Angeles), while rockfishes constituted 60% of the catches in Ventura and Santa Barbara Counties. A flurry of bonito activity occurred at this time off Santa Barbara which was quite different from the preceding year when they were not seen at all in this area during the summer.

The catch of surface fishes remained high during the fall and early winter months when a warm water mass moved into the southern California coastal area. Traditionally, anglers fish for deep-water rockfishes at this time of year, but due to the continued presence of bass and Pacific mackerel off the southern counties, the rockfish catch did not reach its usual high level. Bonito practically disappeared from the area except for a small population at King Harbor in Redondo Beach where a warm water

outfall kept the water temperature within the bonito's tolerance range.

Springtime upwelling resulted in colder than normal water temperatures from March through June. Catch rates were down compared to those of the previous spring; however, surface fishes were still available. Bonito reappeared, and bass and Pacific mackerel remained abundant. Unfortunately, the cold water temperatures during this time prevented the arrival of the big game species which might have migrated into the area if conditions were right. As a result, yellowtail and barracuda catches during the late spring and early summer were insignificant.

Several species uncommon to California waters appeared in the catch this year. A finescale triggerfish, *Balistes polyepis;* a redtail triggerfish, *Xanthichthys mento;* and a sicklefin smoothhound, *Mustelus lunatus*, all belonging to regions much further south of here, were taken from the unseasonably warm water mass off Los Angeles County this winter.

Location Variations

Within the sampled area there was an increasing diversity of species in a north to south direction. The numbers of species encountered in each county's catch were Santa Barbara, 91; Ventura, 114; Los Angeles 141; Orange, 123; and San Diego, 138. Surface fishes were much more abundant, and their variety was greater in the southern counties. The warmer water in this region was responsible for the presence of these species.

Most fishes found in the northern counties of the survey area were also found in the southern counties but in different degrees of abundance. For instance, rockfishes were the mainstay of the Santa Barbara and Ventura County fisheries, contributing 64-65% of the yearly catch. Only 22-26% of the catch in Los Angeles and San Diego Counties was composed of rockfishes. There is very little habitat for deep-water rockfishes in the Orange County coastal area, a circumstance which was reflected by the small percentage of rockfishes in that county's annual catch (17%). Lingcod,

Ophiodon elongatus, was caught frequently in Santa Barbara, Ventura, and San Diego Counties. Lingcod prefer rocky substrates with strong tidal movements, which may explain why they are not caught as frequently in the Los Angeles-Orange County area where there is not much habitat of this nature nearshore.

White croaker was the most commonly landed species in all counties except Santa Barbara (Table 3), but only in Los Angeles County did it constitute a major portion of the catch (39%). In Santa Barbara County only 6% of the yearly catch was composed of white croaker, and the percentage in the three other counties ranged from 12 to 19.

The most successful catches of favored game species (barracuda; halibut, *Paralichthys californicus;* lingcod; white seabass, *Cynoscion nobilis;* and albacore, *Thunnus alalunga*) were made off Orange and San Diego Counties. More than one-quarter of the total catch for these areas was composed of favored game species. Most of the barracuda seen during the survey were landed in Orange County, and all of the albacore sampled were taken off San Diego County.

Although rockfishes accounted for the majority of the catch in Santa Barbara County, other species were of major importance throughout the year. In the summer months bonito was the most commonly landed species, while Pacific mackerel had that distinction during fall and winter. Spring brought the return of king salmon, *Oncorhynchus tshawytscha*, and California halibut to the area. The ubiquitous white croaker was available throughout the year, and the kelp bass was among the top ten species landed during each season.

In Ventura County the most commonly landed species was white croaker, although rockfishes contributed nearly two-thirds of the total catch. Kelp bass; ocean whitefish, *Caulolatilus princeps;* and Pacific sanddabs, *Citharichthys sordidus*, were taken frequently.

Several species were available all year in Los Angeles County due to the warm water conditions. Bonito; kelp bass; barred sand bass; white croaker; and black surfperch, *Embiotoca jacksoni*, constituted the major portion of the catch throughout the year. During the summer large numbers of halibut were landed. Ocean whitefish; halfmoon, *Medialuna californiensis;* and opaleye, *Girella nigricans*, were seen frequently in fall and winter catches. Pacific mackerel showed up in early fall and remained in the area through the following spring.

As was the case last year, Orange County was again the "hot spot" for barracuda. An estimated 8,222 barracuda were landed in the Los Angeles-Orange Counties area during the summer months, more than twice as much as in the three other counties combined. Halibut catches were frequent during the summer, along with catches of spotted sand bass, *Paralabrax maculatofasciatus*, and Pacific bonito. Good catches of kelp bass, barred sand bass, white croaker, and black surfperch were reported all year. Between September and December bonito were scarce, but they were prevalent in the catch during the rest of the year.

White croaker was the most commonly landed fish in San Diego County as it was nearly everywhere else in the survey area. All three bass species and the ocean whitefish were abundant throughout the year. Large numbers of bonito and Pacific mackerel were landed in the spring and summer. Two favored game species, barracuda and albacore, contributed substantially to the summer catch.

Diver Catch

Divers landed 104 species of fishes, molluscs, crustaceans, and echinoderms. Most prevalent in the catch were rock scallops, *Hinnites multirugosus;* abalones; California sheephead, *Pimelometopon pulchrum;* and California spiny lobster. These species accounted for three-quarters of the identified diver catch.

The diver catch varied not so much from changing climatic seasons as from changing fishing seasons: in other words, although some species may have been available at all times of the year, they could only be taken during the legal fishing season. Lobsters were most prevalent during the first few weeks of their open season. Catches of abalones were seen very rarely between mid-January and mid-March when it is illegal to take them. During the rest of the year they constituted nearly one-half of the catch. Rock scallop was the most common species in the catch throughout the year, for there are no seasonal limitations or size limits on this species. The California sheephead is the only fish which divers landed more often than did anglers.

The diver catch did not vary as much between locations as did the angler catch. Scallops, sheephead, and kelp bass were common throughout the survey region. Pink and green abalones, *Haliotis corrugata* and *H. fulgens*, were taken more often in the southern counties while red abalones, *H. rufescens*, were most prevalent in Santa Barbara and Ventura Counties. Lobsters were available in all areas except Orange County, where there is little rocky substrate to offer them protection.

Estimates of Catch and Effort

The 1976-77 catch and effort estimates (Tables 4 and 5) are incomplete due to lack of data for weekdays from October through March in Santa Barbara-Ventura and San Diego Counties. However, based on data collected in these areas during the winter months of the 1975-76 survey, approximations of catch and effort values were made for this time and are included in the adjusted estimates (Table 6) for this year. According to these figures, 318,449 angler days and 17,743 diver days were expended between July 1, 1976, and June 30, 1977, in southern California's coastal areas. Anglers spent over two million hours engaged in fishing and related activities (boat cruising time, fuel stops, meals,

etc.) while divers spent nearly 87,000 hr of diving time and related activities. We estimated that anglers landed 763,062 fishes, and divers landed 56,342 organisms[4/].

Relative Catch Success

The degree of fishing skill varies widely among anglers as does experience and dedication. All kinds of anglers participated in this survey: experienced, knowledgeable anglers who know where the good fishing areas are and know how to hook, play, and land a fish, depending on its type; casual anglers who drop a line anywhere and depend mainly on luck to land a fish; and recreational anglers who are out on their boats for fresh air, a change of scenery, camaraderie, and relaxation--to whom fishing is merely an excuse for the trip.

Therefore a unit effort expended by a dedicated angler is not the same as one expended by a casual or recreational angler. However, as we have no means of assigning empirical values to skill or motivation, the effort unit used in this survey has the same value for all categories of anglers.

Many fishes are caught by southern California sport fishermen but are not kept. These fishes do not show up in our survey since we record only those fishes landed. Some anglers prefer to catch only certain species and will throw back any other species they catch. Others return all fishes, still alive, to the sea since it is only the sport of catching them that these anglers enjoy. Sub-legal size fishes and over-limits of fishes are also released by fishermen who are familiar with, and willing to comply with, California sport fishing regulations.

Therefore, the catch-per-unit-of-effort values (Tables 7 and 8) are not intended to indicate the number of organisms caught by an angler

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4/ This is an unadjusted estimate because there were no estimates made last year for the divers' catch.

or diver in 1 hour. Instead, they are designed to be used as indices of relative catch success which can be compared among counties, seasons, and individual sample locations.

High CPUE values for anglers were obtained in Santa Barbara-Ventura Counties from July through January (Table 7). As soon as salmon season opened in February however, CPUE values dropped abruptly due to the large number of hopeful but unsuccessful anglers trolling for salmon. Even so, the average CPUE values for Santa Barbara-Ventura Counties were the highest in the sampled area during each season. This is not necessarily due to the expertise of the anglers in these counties. Instead, the high values reflect the abundance of rockfishes, the anglers' target species. Since warm water surface fishes were not always available in this area, anglers concentrated their efforts on the more abundant rockfishes.

In Los Angeles, Orange, and San Diego Counties where preferred game species were more likely to be found, anglers spent considerable time fishing for particular species and released any non-preferred species caught. This resulted in lower CPUE values, for these values are based on fishes landed, as opposed to fishes caught. The CPUE values for these areas were highest during the winter months when anglers switched from surface fishing to deepwater rockfish fishing.

The catch per unit of effort varied considerably between indiviudal sample locations as well as between seasons. The exceedingly large numbers of white croaker landed at Cabrillo Beach launch ramp in Los Angeles County resulted in the highest annual CPUE for the entire sampling region--0.88 fish/angler-trip-hour. At Golden Shore launch ramp, 4½ miles to the south, the annual CPUE was also relatively high--0.55 fish/angler-trip-hour. But 8 miles north of Cabrillo Beach, at Redondo Beach, the CPUE value for the boat rental facility was only 0.15. These values reflect both the type of fish habitat offshore and the kinds of

fishes which are target species.

Diver CPUE for the year averaged 0.76 organisms/diver-trip-hour in Santa Barbara-Ventura Counties, 0.58 organisms/diver-trip-hour in Los Angeles-Orange Counties, and 0.69 organisms/diver-trip-hour in San Diego County (Table 8). CPUE values for divers are always higher than those for anglers. To begin with, divers have a finite length of time when they can be underwater since they are dependent on their scuba tanks for air. When the tanks have been emptied, divers usually start back to the launch ramp. Anglers, on the other hand, usually stop fishing only when rough weather, darkness, or tiredness compels them to do so. Thus, anglers tend to spend more time fishing than divers do. Also, divers can actively search for their prey while anglers must patiently wait for a fish to bite.

Length Frequencies

The proportion of legal-size fishes measured this year rose slightly compared to last year. Almost every species with legal size limits showed a measurable increased in percentage of legal fishes landed (Table 9). Whether this is due to our samplers' efforts to educate the public concerning Fish and Game regulations is not certain. It would seem too much of a coincidence however, to attribute this increase to the appearance of large year classes which reached legal size simultaneously in the eleven species concerned. There may be many factors attributing to the increase in legal-size fishes landed, but our sampling program can probably claim partial credit for the improvement.

Those species taken almost exclusively by divers fared best: abalones averaged 94% legals, and 96% of the California spiny lobsters measured were legal size. Anglers showed good compliance with the 30 cm (12-inch) bass size limit, landing only 14% sub-legals. However, the statistics for three of the favored sport fishes, halibut, barracuda, and white seabass, are still not encouraging.

Less than 60% of the halibut and 74% of the barracuda measured were legal. An estimated 5,770 short halibut and 4,125 short barracuda were landed this year. Both of these species are caught seasonally, and when the season is at its peak and fish are abundant, the percentage of sub-legal size fishes landed is low. At other times of the year, when halibut and barracuda are scarce, fishermen tend to keep whatever they catch--regardless of size--because they feel they won't be able to catch another.

The only practical solutions for this problem are to educate the public about our laws and the reasons behind them and to step up enforcement of the laws. The latter means not just apprehending lawbreakers but also ensuring that a fine will be levied which will make illegal fishing very expensive.

The 1977 California Sport Fishing Regulations allowed the possession of one white seabass less than 71 cm (28 inches) per fisherman per day. An incredible 94% of all white seabass measured were in this category. Thus only 6% (169 of the estimated 2,649 landed) were longer than the minimum size limit.

Length frequency graphs of the species with legal size requirements and graphs for several other species (Figures 2-10) indicate the size ranges taken by private-boat sport fishermen.

Public Reaction to the Survey

Among the thousands of fishermen interviewed during this survey's 2-year history, only a small portion were uncooperative or open belligerent towards the Department, or its employees, or both. Those who displayed this attitude either had illegal fishes in their possession and were fully aware that they were breaking the law, or had been apprehended at some previous time for infraction(s) of Fish and Game regulations. Less than 5% of the fishermen contacted belonged to this category.

For the most part we have received favorable reactions from the public concerning our survey. Samplers provided an important line of communication between the small boat fisherman and the Department. We heard complaints about Fish and Game laws, policies, and rising license costs, but we also heard approvals and positive comments about our services, programs, and personnel. The fishermen, in turn, heard the Department's side of the story and became aware of the many factors involved in resource management.

The vast majority of the public showed that it was pleased to see a representative of the Department and immediately began asking questions of our samplers. These questions ranged from, "Where's the nearest fuel dock?" to, of course, "Where is the best fishing?" Our samplers are of direct benefit to the public as sources of information. We supply information on location and condition of boat launching facilities, currently good fishing areas, identification of landed fishes, methods of cleaning and cooking fish, and perhaps most important, the sport fishing regulations and why they are necessary.

Our samplers pass out hundreds of copies of the fishing regulations each month to fishermen who don't have them or who may never have heard of them. Many of the illegal fishes we saw were caught by people who simply were ignorant of the laws. Admittedly, ignorance is no excuse, but it is the Department's responsibility to familiarize people with the rules. Many of the fishing violations we saw would not have occurred if the person had been aware of the laws.

To take this a step further, a knowledge of the sport fishing regulations is not enough. It is not sufficient to know that there is a 12-inch size limit on barred sand bass. Obviously one must also know what a barred sand bass looks like. There are very few ways for a fisherman to learn which name goes with which fish. If he has been observant

on partyboats (commercial sport-fishing boats), he may have learned the names of several fishes from deckhands, the skipper, or other fishermen. However, these names may not be correct. Descriptions and drawings of eight sport fishes are printed in the Department's free Ocean Fishing Maps. These publications are very good sources of information to the fishermen and should be widely distributed. Still, they identify only eight fishes. Our samplers identify all the fishes in each sampled party's catch, and if a fisherman is interviewed by us several times he can learn much about fish identification (of course this assumes that he has landed some fishes for us to identify). We especially try to teach identification of those species mentioned in the regulations.

One of the most frequent requests of anglers is where to obtain a book on fish identification. Many people are very eager to learn the names of the fishes they have caught, and a number of them are interested in learning about the life histories of our local fishes.

SUMMARY

For the second consecutive year a program of random field sampling of private-boat sport fishermen was conducted in southern California to obtain information on fishing effort, catch, and size composition of the catch of selected species. From these data, estimates were made of the total fishing effort and catch by anglers and divers fishing from private boats in southern California from July 1, 1976, to June 30, 1977.

Angling effort was greatest during the summer when weather conditions were mild, people were vacationing, and favored game species were available. Diving effort was greatest at the beginning of lobster season, in October and early November. Throughout the year, launch ramps in Los Angeles-Orange Counties received the heaviest use by anglers, but those in San Diego and Santa Barbara-Ventura Counties were preferred by divers.

Over 180 species were identified in the sampled catches, but more than one-half of the catch was composed of only eight species: white croaker, Pacific bonito, kelp bass, olive rockfish, barred sand bass, bocaccio, Pacific mackerel, and copper rockfish.

The catch of surface fishes remained high during the fall and winter months due to a warm water mass off the southern California coast. White croaker was the most commonly landed fish in all counties except Santa Barbara, and in Los Angeles County it contributed nearly 40% of the catch. The biggest catches of favored game species (albacore, barracuda, halibut, lingcod, and white seabass) were taken off Orange and San Diego Counties.

We estimated approximately 318,500 angler days and 18,000 diver days were expended, and over 800,000 fishes and other organisms were landed by private-boat sport fishermen during the 12-month survey.

Very small proportions of abalones and lobsters (which are taken almost exclusively by divers) were less than minimum legal size. Anglers showed good compliance with the size limit imposed on bass, but more than 40% of the halibut and 25% of the barracuda landed were short. Only 6% of the white seabass measured were longer than the minimum size limit.

Most of the people interviewed were very cooperative and many expressed a desire to see more information available on fish identification and location of currently good fishing areas.

RECOMMENDATIONS

Education of the public seems to be the first step towards minimizing violations of sport fishing laws and conserving our marine resources. It is important that information on fishing laws be readily available to the fisherman. Under current policy, distribution of the sport fishing regulations booklet is left to the discretion of the authorized license

distributor. It became obvious during this survey that these distributors are not handing out the booklets on a regular basis. Therefore, it should be mandatory that a copy of the sport fishing regulations be issued at the time of the license purchase. A disturbing fact is that while over two million sport-fishing licenses were sold this year, only 1½ million fishing regulation booklets were printed, and even fewer were distributed.

It is suggested that the California Sport Fishing Regulations booklet be revised to include descriptions of selected marine fishes and drawings of the species with size limits. There are 31 fish species and 5 fish groups (sharks, rays, etc.) mentioned in the ocean fishing chapter of the 1977 regulations. It would be confusing to have pictures and descriptions of all these fishes in the regulation booklet. But a description and simple line drawing which notes identifying characteristics should be included for the 10 species which have size limits. A few simple methods for identifying fish groups such as rockfishes, bass, and salmon should also be added.

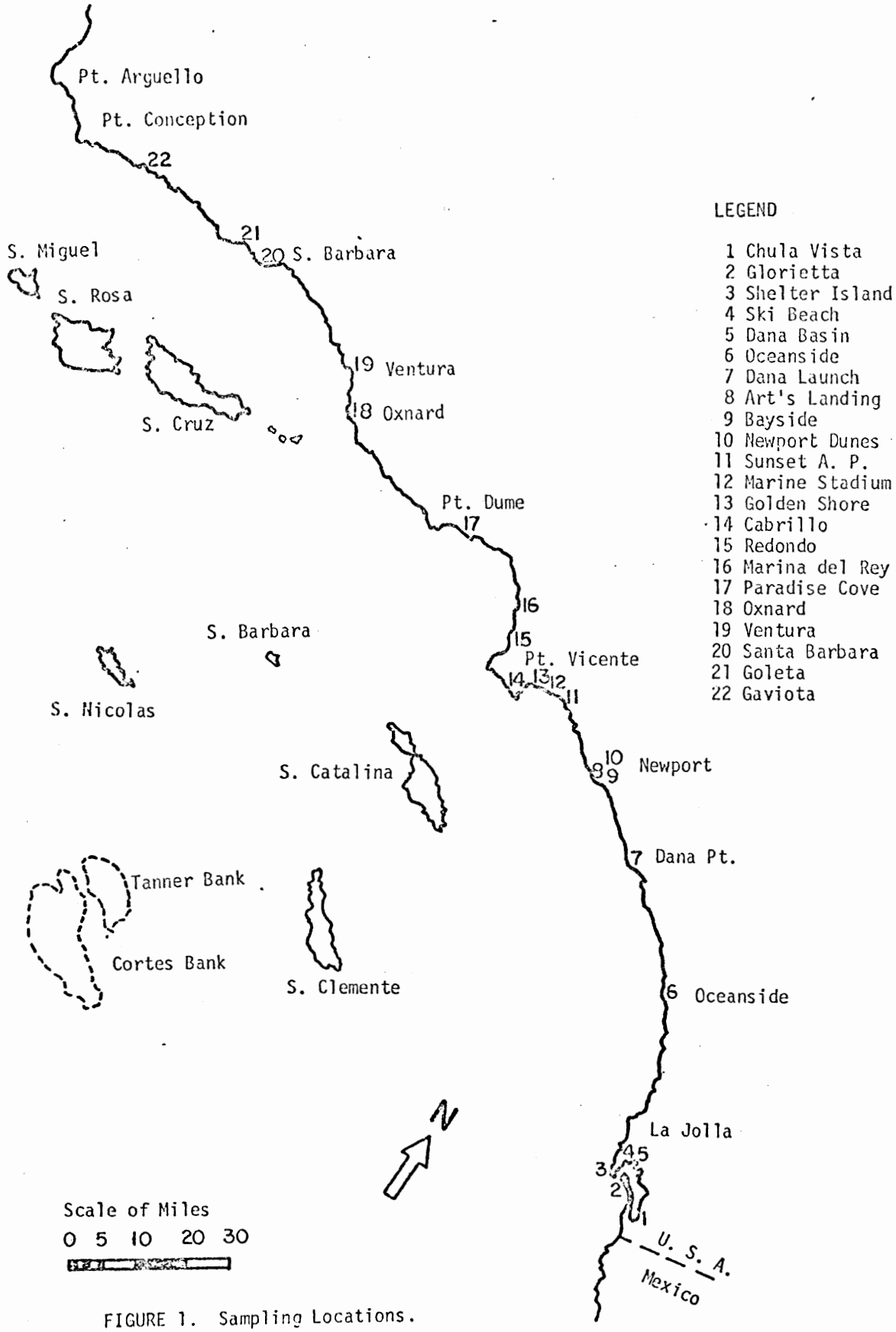


FIGURE 1. Sampling Locations.

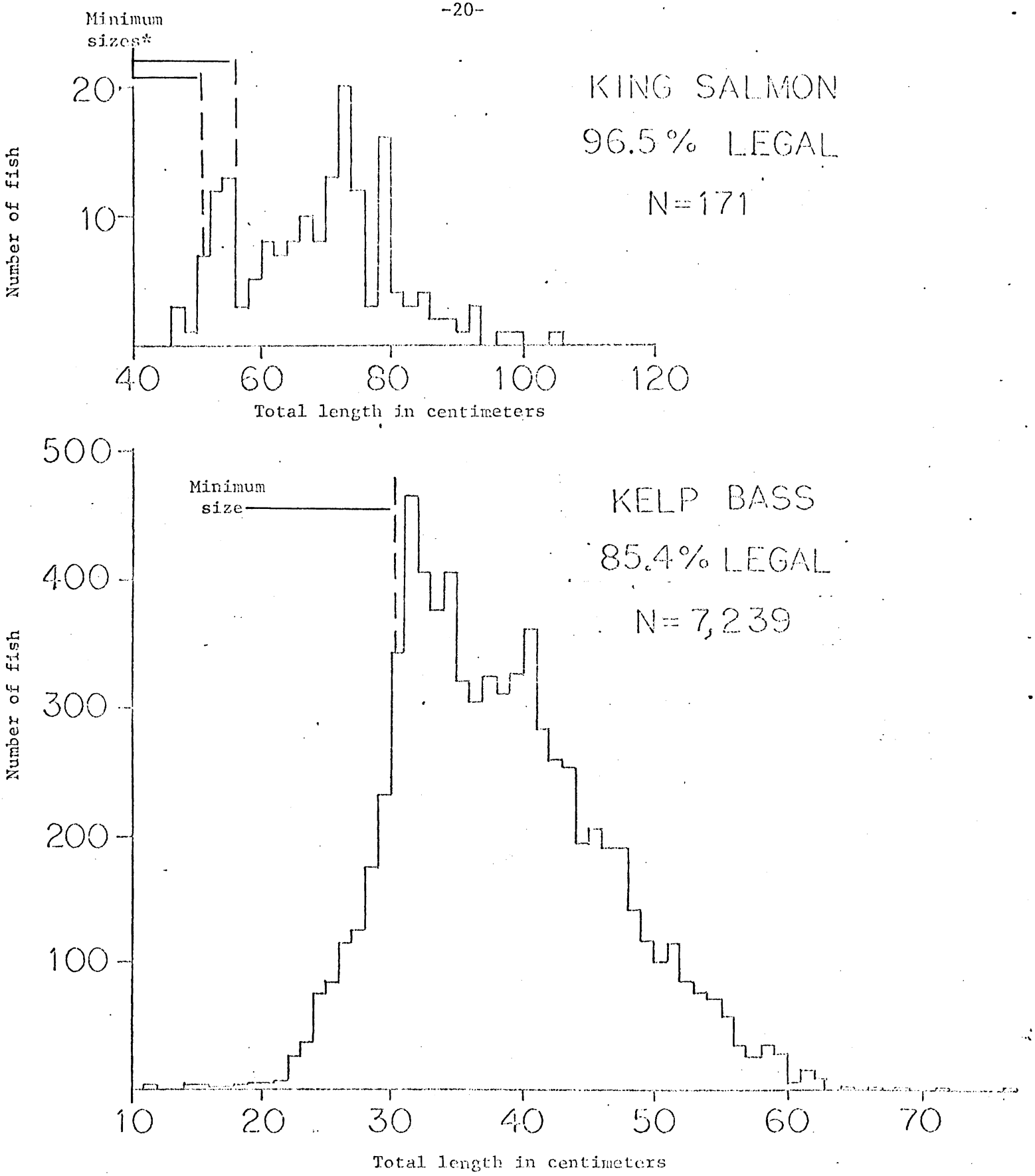


FIGURE 1. Length frequencies of king salmon and kelp bass.

* One salmon between 20-22 inches may be kept. All others must be over 22 inches in length.

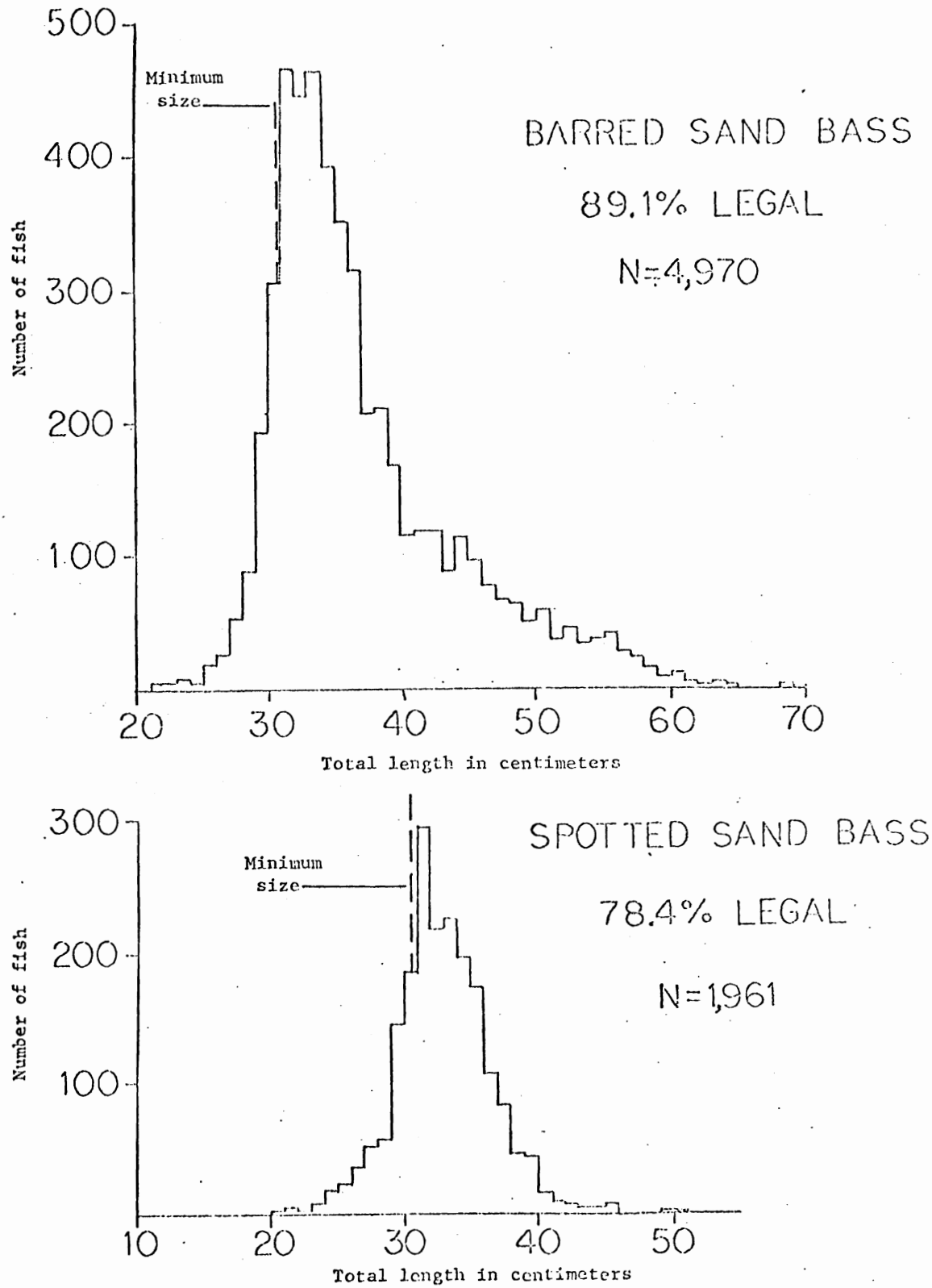


FIGURE 2. Length frequencies of barred sand bass and spotted sand bass.

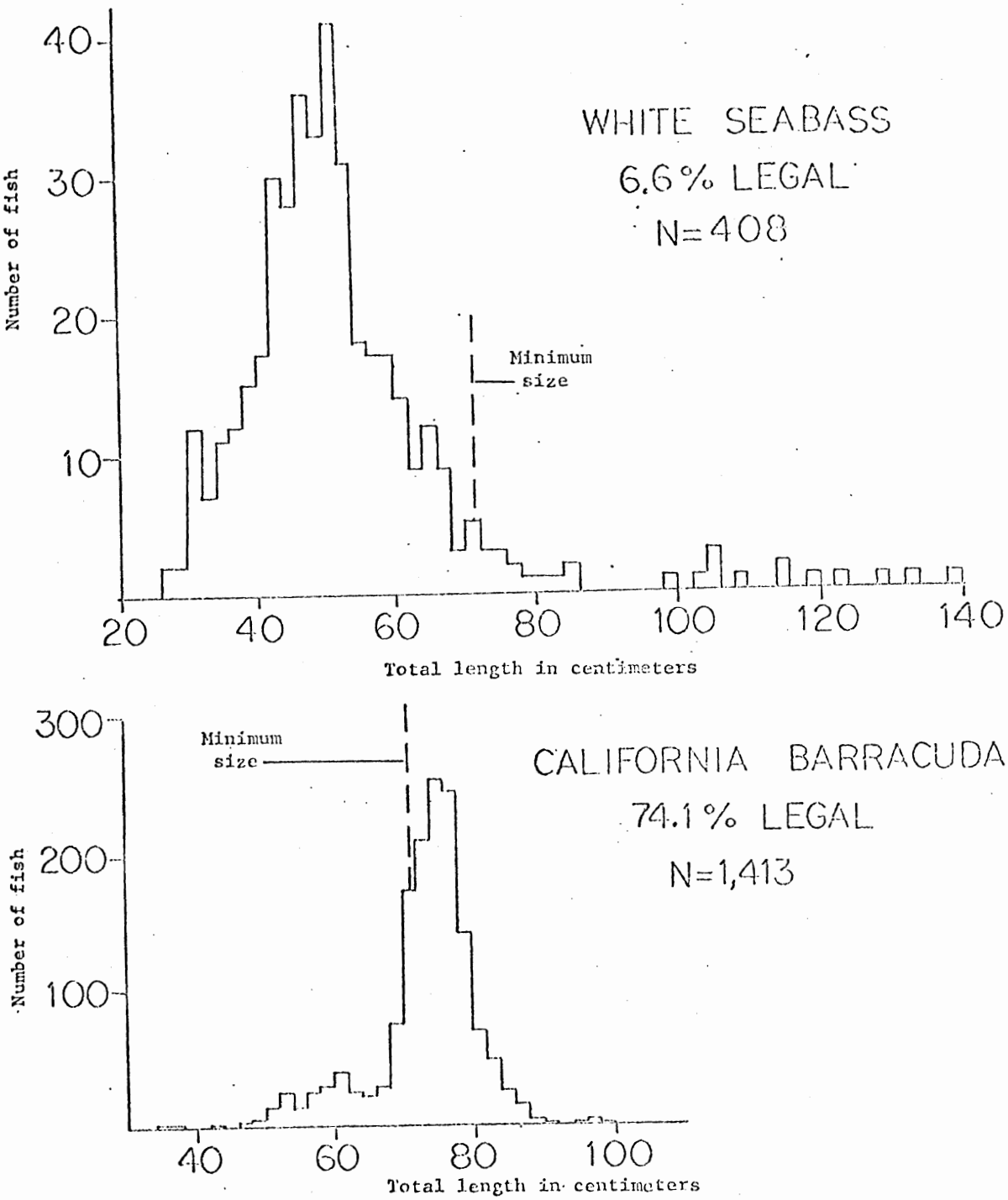


FIGURE 3. Length frequencies of white seabass and California barracuda.

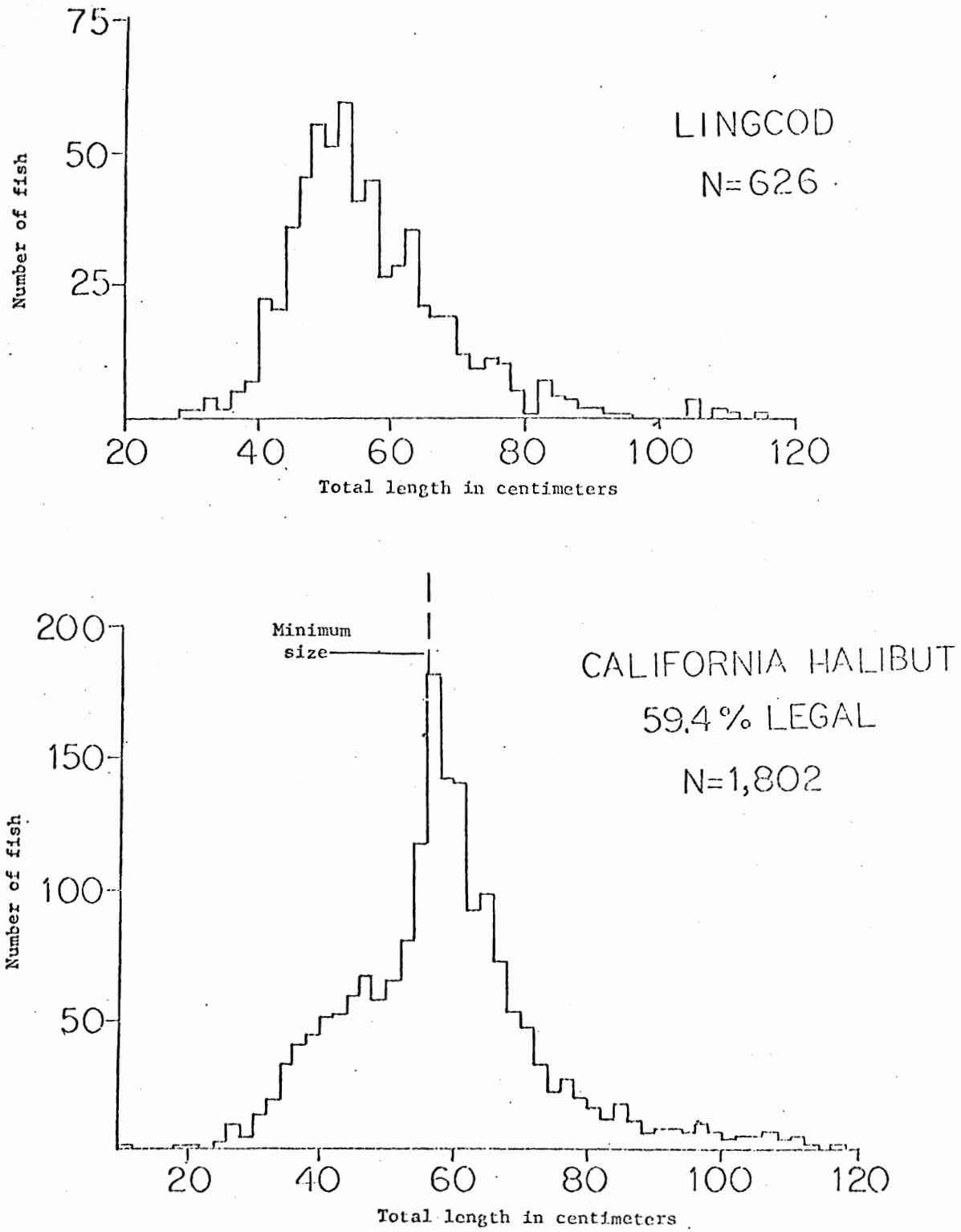


FIGURE 4. Length frequencies of lingcod and California halibut.

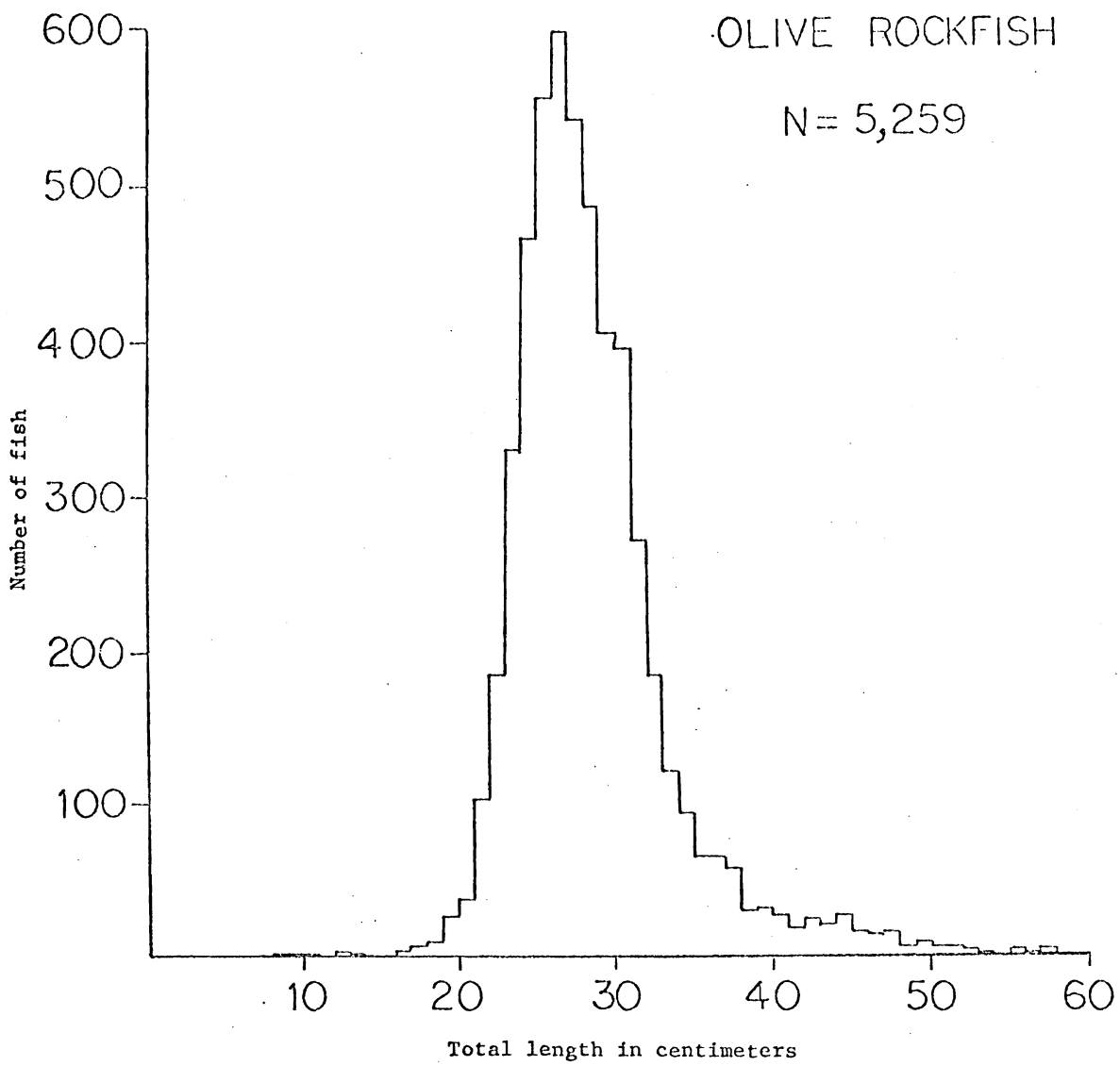


FIGURE 5. Length frequency of olive rockfish.

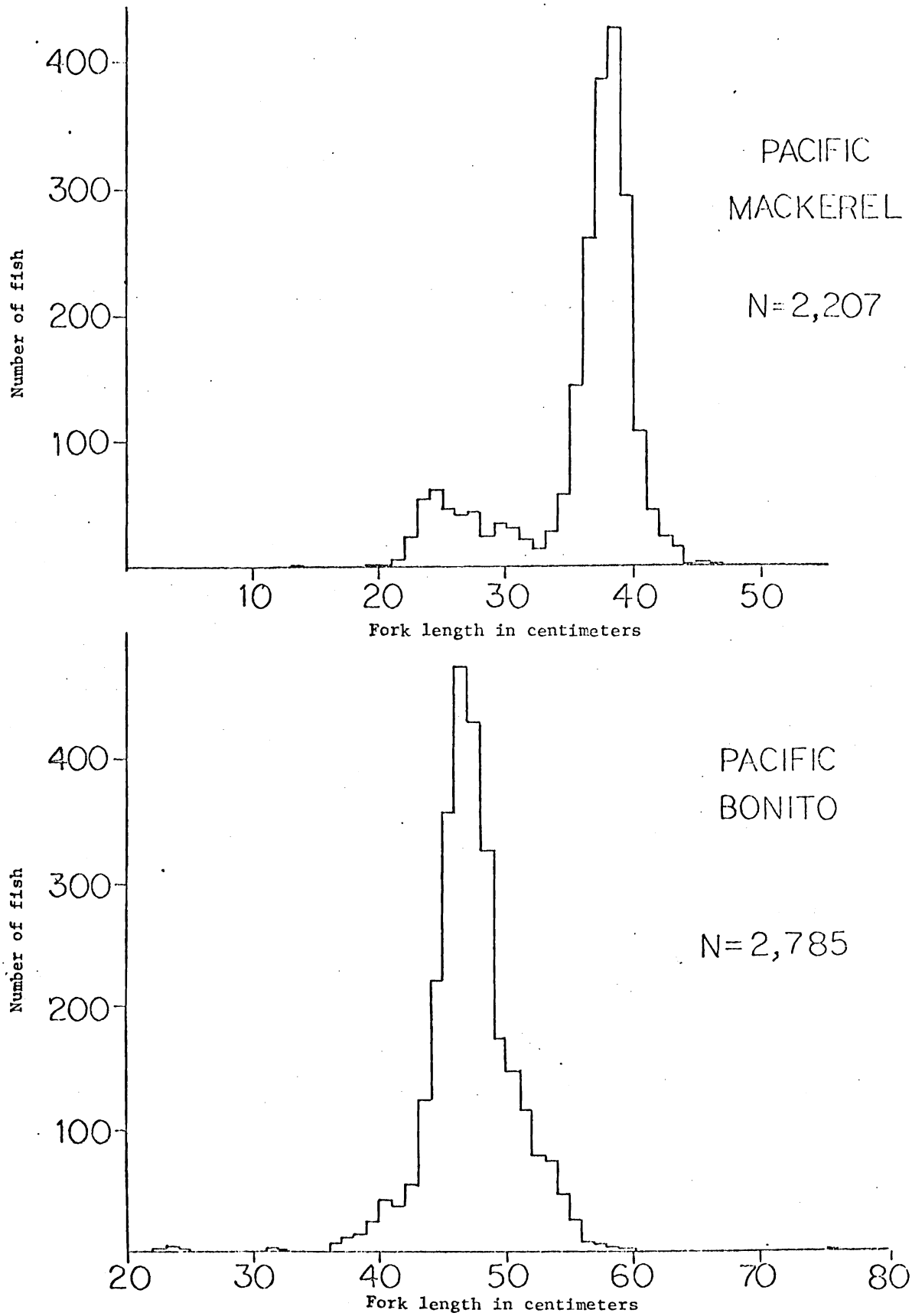


FIGURE 6. Length frequencies of Pacific mackerel and Pacific bonito.

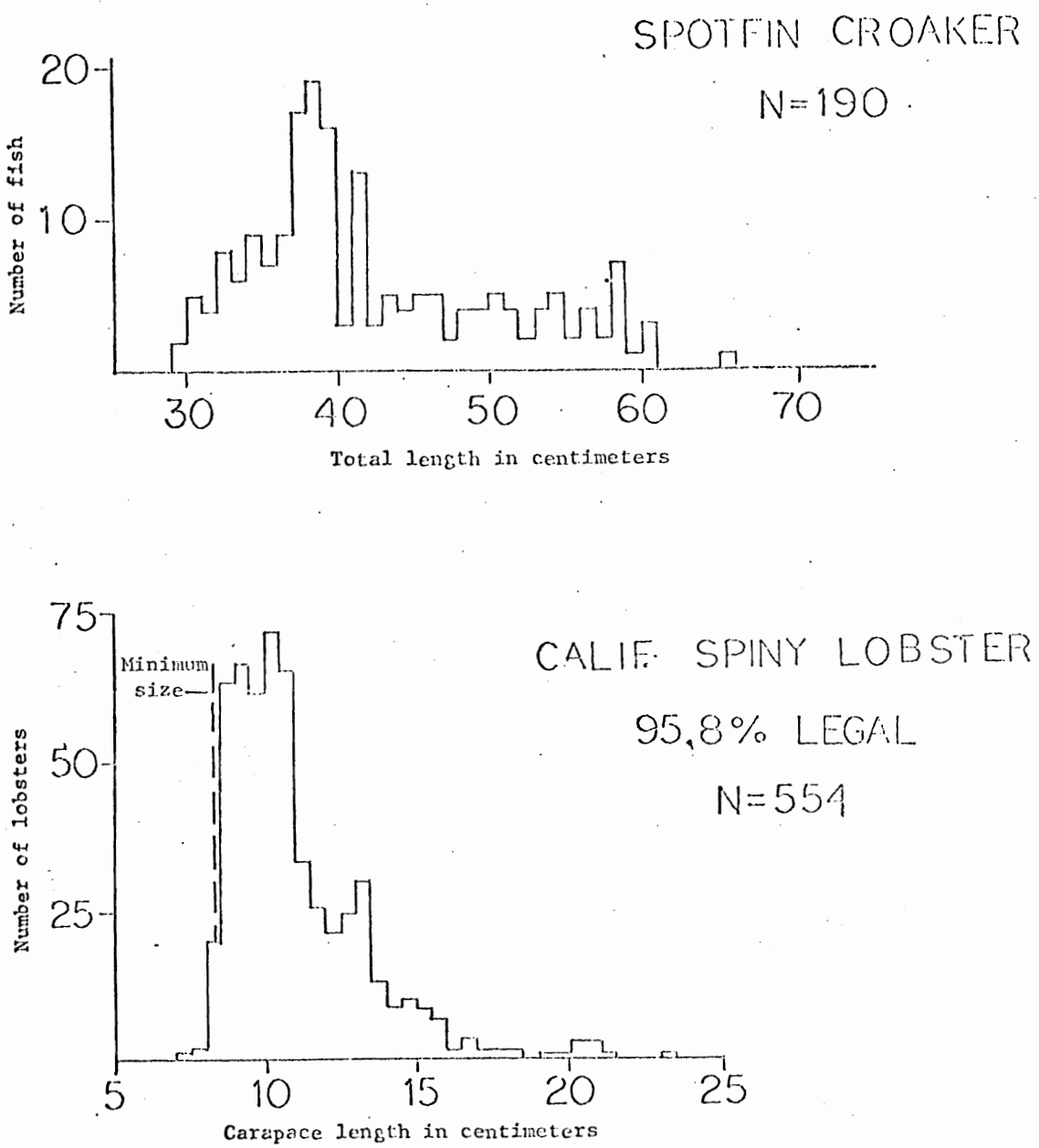


FIGURE 7. Length frequencies of spotfin croaker and California spiny lobster.

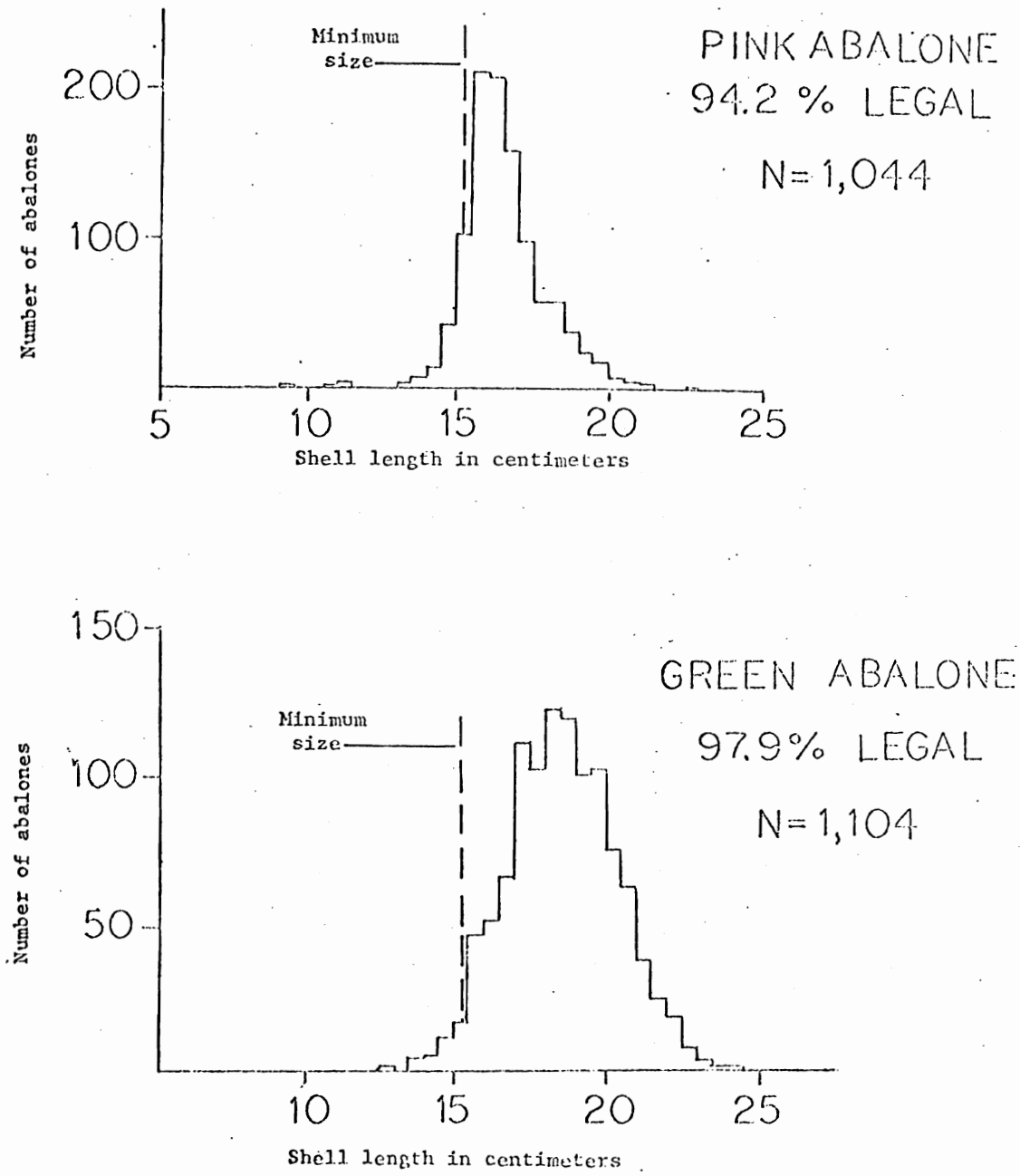
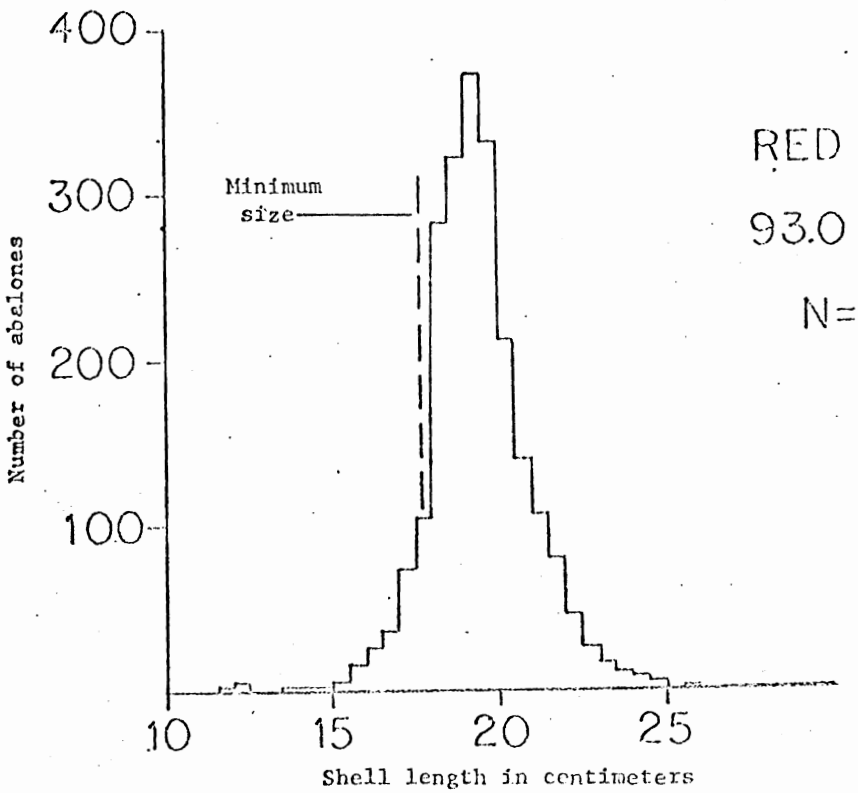


FIGURE 8. Length frequencies of pink abalones and green abalones.



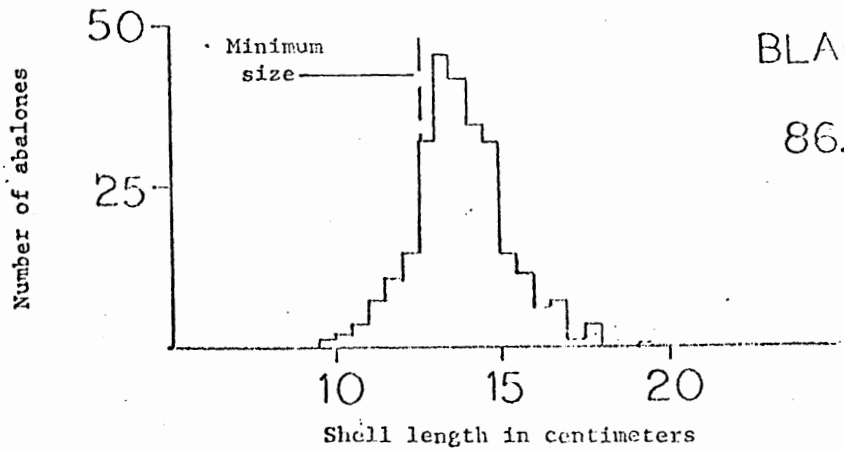


FIGURE 9. Length frequencies of red abalones and black abalones.

TABLE 1. List of Species Sampled from Southern California Private Boats; July 1976 through June 1977.

Scientific name	Common name	No. sampled
	Fishes	
Alopias vulpinus	thresher shark	51
Amphistichus argenteus	barred surfperch	103
A. koelzi	calico surfperch	4
Anisotremus davidsonii	sargo	132
Anoplopoma fimbria	sablefish	945
Atherinops affinis	topsmelt	162
Atherinopsis californiensis	jacksmelt	219
Auxis rochei	bullet mackerel	4
Balistes polyepis	finescale triggerfish	2
Brachyistius frenatus	kelp surfperch	6
Caulolatilus princeps	ocean whitefish	3,450
Cephaloscyllium ventriosum	swell shark	11
Cheilotrema saturnum	black croaker	227
Chromis punctipinis	blacksmith	50
Citharichthys sordidus	Pacific sanddab	2,337
C. stigmaeus	speckled sanddab	33
C. xanthostigma	longfin sanddab	4
Coryphaena hippurus	dolphinfish	9
Cymatogaster aggregata	shiner surfperch	88
Cynoscion nobilis	white seabass	473
C. spp.	unidentified croaker	1
Damalichthys vacca	pile surfperch	177
Embiotoca jacksoni	black surfperch	2,573
E. lateralis	striped surfperch	79
Eopsetta jordani	petrale sole	62
Euthynnus pelamis	skipjack	14
Galeorhinus zyopterus	soupfin shark	41
Genyonemus lineatus	white croaker	34,695
Gibbonsia spp.	kelpfish	1
Girella nigricans	opaleye	1,018
Glyptocephalus zachirus	rex sole	2
Gymnothorax mordax	California moray	33
Halichoeres semicinctus	rock wrasse	84
Hermosilla azurea	zebraperch	1
Heterodontus francisci	horn shark	10
Heterostichus rostratus	giant kelpfish	454
Hexagrammos decagrammus	kelp greenling	3
Hippoglossina stomata	bigmouth sole	53
Hydrolagus colliei	ratfish	30
Hyperprosopon argenteum	walleye surfperch	235
H. ellipticum	silver surfperch	15
Hypsopsetta guttulata	diamond turbot	133
Hypsurus caryi	rainbow surfperch	77
Hypsypops rubicundus	garibaldi	5
Isurus oxyrinchus	bonito shark	15
Lamna ditropis	salmon shark	1
Lepidopsetta bilineata	rock sole	6

TABLE 1. - cont.

Scientific name	Common name	No. sampled
Leptocottus armatus	staghorn sculpin	2
Medialuna californiensis	halfmoon	1,672
Menticirrhus undulatus	California corbina	43
Merluccius productus	Pacific hake	111
Micrometrus aurora	reef surfperch	1
Mola mola	common mola	8
Mustelus californicus	gray smoothhound	132
M. henlei	brown smoothhound	82
*M. lunatus**	sicklefin smoothhound	1
Myliobatis californica	bat ray	43
Neoclinus blanchardi	sarcastic fringehead	11
N. uninotatus	onespot fringehead	2
Oncorhynchus kisutch	silver salmon	2
O. tshawytscha	king salmon	182
Ophiodon elongatus	lingcod	753
Oxyjulis californica	senorita	178
Paralabrax clathratus	kelp bass	8,457
P. maculatofasciatus	spotted sand bass	2,140
P. nebulifer	barred sand bass	5,767
Paralichthys californicus	California halibut	1,915
Parophrys vetulus	English sole	2
Peprilus simillimus	Pacific butterfish	15
Phanerodon atripes	sharpnose surfperch	1
P. furcatus	white surfperch	360
Pimelometopon pulchrum	California sheephead	2,327
Platichthys stellatus	starry flounder	8
Platyrhinoidis triseriata	thornback	12
Pleuronichthys coenosus	C O turbot	16
P. decurrens	curlfin turbot	6
Porichthys myriaster	specklefin midshipman	3
P. notatus	plainfin midshipman	4
Prionace glauca	blue shark	478
Prionotus stephanophrys	lumptail searobin	3
Rhacochilus toxotes	rubberlip surfperch	262
Rhinobatos productus	shovelnose quitarfish	112
Roccus saxatilus	striped bass	43
Roncador stearnsii	spotfin croaker	223
Sarda chiliensis	Pacific bonito	10,073
Scomber japonicus	Pacific mackerel	4,587
Scorpaena guttata	sculpin	2,709
Scorpaenichthys marmoratus	cabezon	1,016
Sebastes alutus	Pacific ocean perch	3
S. atrovirens	kelp rockfish	2,319
S. auriculatus	brown rockfish	2,573
S. aurora	aurora rockfish	8
S. babcocki	redbanded rockfish	3
S. brevispinis	silvergray rockfish	3
S. carnatus	gopher rockfish	568
S. caurinus	copper rockfish	4,436
S. chlorostictus	greenspotted rockfish	3,072
S. chrysomelas	black & yellow rockfish	282
S. constellatus	starry rockfish	1,312

*unverified identification

TABLE 1. - cont.

Scientific name	Common name	No. sampled
S. dallii	calico rockfish	165
S. diploproa	splitnose rockfish	47
S. elongatus	greenstriped rockfish	861
S. ensifer	swordspine rockfish	71
S. entomelas	widow rockfish	279
S. eos	pink rockfish	55
S. flavidus	yellowtail rockfish	110
S. gilli	bronzespotted rockfish	15
S. goodei	chilipepper	1,369
S. helvomaculatus	rosethorn rockfish	16
S. hopkinsi	squarespot rockfish	104
S. jordani	shortbelly rockfish	1
S. lentiginosus	freckled rockfish	3
S. levis	cowcod	173
S. macdonaldi	Mexican rockfish	50
S. melanops	black rockfish	5
S. melanostomus	blackgill rockfish	55
S. miniatus	vermilion rockfish	3,606
S. mystinus	blue rockfish	3,179
*S. nigrocinctus**	tiger rockfish	1
S. ovalis	speckled rockfish	321
S. paucispinis	bocaccio	5,209
S. phillipsi	chameleon rockfish	14
S. pinniger	canary rockfish	176
S. proriger	redstripe rockfish	4
S. rastrelliger	grass rockfish	2,017
S. rosaceus	rosy rockfish	890
S. rosenblatti	greenblotched rockfish	1,339
S. ruberrimus	yelloweye rockfish	10
S. rubrivinctus	flag rockfish	772
S. rufus	bank rockfish	109
S. saxicola	stripetail rockfish	13
S. semicinctus	halfbanded rockfish	25
S. simulator	pinkrose rockfish	2
S. serranoides	olive rockfish	6,796
S. serriceps	treefish	468
S. umbrosus	honeycomb rockfish	807
Sebastolobus alascanus	shortspine thornyhead	1
Seriola dorsalis	yellowtail	106
Seriphus politus	queenfish	1,050
Sphyraena argentea	California barracuda	1,982
Squalus acanthias	spiny dogfish	482
Squatina californica	angel shark	5
Stereolepis gigas	giant seabass	19
Strongylura exilis	California needlefish	16
Synodus lucioceps	California lizardfish	645
Tetrapturus audax	striped marlin	7
Thunnus alalunga	albacore	606
T. albacares	yellowfin tuna	11
T. thynnus	bluefin tuna	9
Trachurus symmetricus	jack mackerel	720

*unverified identification

TABLE 1. - cont.

Scientific name	Common name	No. sampled
Triakis semifasciata	leopard shark	19
Umbrina roncador	yellowfin croaker	192
Urolophus halleri	round stingray	11
Xanthichthys mento	redtail triggerfish	1
Xenistius californiensis	salema	2
Xystreurys liolepis	fantail sole	16
Sebastes spp.	unidentified rockfish fillets	6,334
- - - -	unidentified fish fillets	660
	Molluscs and Crustaceans	
Astraea undosa	wavy top	3
Cancer anthonyi	yellow crab	54
C. antennarius	rock crab	414
C. productus	red crab	117
Cypraea spadicea	chestnut cowry	63
Dosidicus gigas	jumbo squid	116
Emerita analoga	sand crab	1
Haliotis assimilis	threaded abalone	15
H. corrugata	pink abalone	1,117
H. cracherodii	black abalone	352
H. fulgens	green abalone	1,256
H. rufescens	red abalone	2,354
H. sorenseni	white abalone	73
Hinnites multirugosus	rock scallop	3,527
Kelletia kelletii	kellets whelk	38
Loligo opalescens	market squid	7
Lottia gigantea	owl limpet	286
Loxorhynchus grandis	sheep crab	5
Megathura crenulata	giant keyhole limpet	5
Mytilus edulis	bay mussel	50
Norrisia norrisi	smooth turban snail	2
Octopus bimaculatus	twospot octopus	39
Panulirus interruptus	California spiny lobster	691
Protothaca staminea	common littleneck	100
Pugettia gracilis	graceful kelp crab	1
Semile decisa	clipped semile	2
Tegula funebralis	black turban	1
Tivela stultorum	pismo clam	123
Ventricola fordii	fords venus	1
Brachyura	unclassified spider crab	61
	Echinoderms	
Pisaster spp.	sea star	28
Strongylocentrotus franciscanus	red urchin	114
S. purpuratus	purple urchin	30
Holothuroidea	sea cucumber	1
	Total	159,547

TABLE 2. Most Commonly Landed Species; July 1976 through June 1977.

Scientific name	Common name	No. sampled
	Fishes	
Genyonemus lineatus	white croaker	34,695
Sarda chiliensis	Pacific bonito	10,073
Paralabrax clathratus	kelp bass	8,457
Sebastes serranoides	olive rockfish	6,796
Paralabrax nebulifer	barred sand bass	5,767
Sebastes paucispinis	bocaccio	5,209
Scomber japonicus	Pacific mackerel	4,587
Sebastes caurinus	copper rockfish	4,436
S. miniatus	vermilion rockfish	3,606
Caulolatilus princeps	ocean whitefish	3,450
Sebastes mystinus	blue rockfish	3,179
S. chlorostictus	greenspotted rockfish	3,072
Scorpaena guttata	sculpin	2,709
Embiotoca jacksoni	black surfperch	2,573
Sebastes auriculatus	brown rockfish	2,573
Citharichthys sordidus	Pacific sanddab	2,337
Pimelometopon pulchrum	California sheephead	2,327
Sebastes atrovirens	kelp rockfish	2,319
Paralabrax maculatofasciatus	spotted sand bass	2,140
Sebastes rastrelliger	grass rockfish	2,319
Sphyraena argentea	California barracuda	1,982
Paralichthys californicus	California halibut	1,915
Medialuna californiensis	halfmoon	1,672
Sebastes goodei	chilipepper	1,369
S. rosenblatti	greenblotched rockfish	1,339
S. constellatus	starry rockfish	1,312
Seriphus politus	queenfish	1,050
Girella nigricans	opaleye	1,018
Scorpaenichthys marmoratus	cabezon	1,016
Anoplopoma fimbria	sablefish	945
Sebastes rosaceus	rosy rockfish	890
S. elongatus	greenstriped rockfish	861
S. umbrosus	honeycomb rockfish	807
S. rubrivinctus	flag rockfish	772
Ophiodon elongatus	lingcod	753
Trachurus symmetricus	jack mackerel	720
Synodus lucioceps	California lizardfish	645
Thunnus alalunga	albacore	606
Sebastes carnatus	gopher rockfish	568
Squalus acanthias	spiny dogfish	482
Prionace glauca	blue shark	478
Cynoscion nobilis	white seabass	473
Sebastes serriceps	treefish	468
Heterostichus rostratus	giant kelpfish	454
Phanerodon furcatus	white surfperch	360
Sebastes ovalis	speckled rockfish	321
S. chrysomelas	black and yellow rockfish	282

TABLE 2 - Cont.

Scientific name	Common name	No. sampled
	Molluscs and Crustaceans	
Hinnites multirugosus	rock scallop	3,527
Haliotis rufescens	red abalone	2,354
H. fulgens	green abalone	1,256
H. corrugata	pink abalone	1,117
Panulirus interruptus	California spiny lobster	691
Cancer antennarius	rock crab	414
Haliotis cracherodii	black abalone	352
Lottia gigantea	owl limpet	286
	Total	145,877

The above species constitute 96% of the identified catch. The remaining 4% is composed of 6,676 organisms of 137 species.

TABLE 3. Fifteen Most Commonly Landed Species in Each County; July 1976 through June 1977.

County	Rank	Scientific name	Common name
Santa Barbara	1.	*Sebastes caurinus*	copper rockfish
	2.	*Paralabrax clathratus*	kelp bass
	3.	*Sebastes chlorostictus*	greenspotted rockfish
	4.	*Genyonemus lineatus*	white croaker
	5.	*Sebastes atrovirens*	kelp rockfish
	6.	*S. serranoides*	olive rockfish
	7.	*Haliotis rufescens*	red abalone
	8.	*Hinnites multirugosus*	rock scallop
	9.	*Scomber japonicus*	Pacific mackerel
	10.	*Sarda chiliensis*	Pacific bonito
	11.	*Sebastes auriculatus*	brown rockfish
	12.	*S. paucispinis*	bocaccio
	13.	*S. rastrelliger*	grass rockfish
	14.	*S. miniatus*	vermilion rockfish
	15.	*S. mystinus*	blue rockfish
Ventura	1.	*Genyonemus lineatus*	white croaker
	2.	*Sebastes caurinus*	copper rockfish
	3.	*S. paucispinis*	bocaccio
	4.	*Paralabrax clathratus*	kelp bass
	5.	*Sebastes serranoides*	olive rockfish
	6.	*S. mystinus*	blue rockfish
	7.	*Hinnites multirugosus*	rock scallop
	8.	*Citharichthys sordidus*	Pacific sanddab
	9.	*Sebastes miniatus*	vermilion rockfish
	10.	*S. auriculatus*	brown rockfish
	11.	*S. chlorostictus*	greenspotted rockfish
	12.	*Pimelometopon pulchrum*	California sheephead
	13.	*Haliotis corrugata*	pink abalone
	14.	*Sebastes rosaceus*	rosy rockfish
	15.	*S. constellatus*	starry rockfish
Los Angeles	1.	*Genyonemus lineatus*	white croaker
	2.	*Sarda chiliensis*	Pacific bonito
	3.	*Sebastes serranoides*	olive rockfish
	4.	*Paralabrax clathratus*	kelp bass
	5.	*Sebastes paucispinis*	bocaccio
	6.	*Embiotoca jacksoni*	black surfperch
	7.	*Scomber japonicus*	Pacific mackerel
	8.	*Paralabrax nebulifer*	barred sand bass
	9.	*Caulolatilus princeps*	ocean whitefish
	10.	*Medialuna californiensis*	halfmoon
	11.	*Scorpaena guttata*	sculpin
	12.	*Sebastes mystinus*	blue rockfish
	13.	*S. miniatus*	vermilion rockfish
	14.	*S. auriculatus*	brown rockfish
	15.	*Paralichthys californicus*	California halibut

TABLE 3. - Cont.

County	Rank	Scientific name	Common name
Orange	1.	*Genyonemus lineatus*	white croaker
	2.	*Sarda chiliensis*	Pacific bonito
	3.	*Paralabrax clathratus*	kelp bass
	4.	*P. nebulifer*	barred sand bass
	5.	*Sphyraena argentea*	California barracuda
	6.	*Paralabrax maculatofasciatus*	spotted sand bass
	7.	*Scorpaena guttata*	sculpin
	8.	*Embiotoca jacksoni*	black surfperch
	9.	*Sebastes paucispinis*	bocaccio
	10.	*Scomber japonicus*	Pacific mackerel
	11.	*Sebastes serranoides*	olive rockfish
	12.	*Hinnites multirugosus*	rock scallop
	13.	*Sebastes goodei*	chilipepper
	14.	*Paralichthys californicus*	California halibut
	15.	*Medialuna californiensis*	halfmoon
San Diego	1.	*Genyonemus lineatus*	white croaker
	2.	*Sarda chiliensis*	Pacific bonito
	3.	*Paralabrax nebulifer*	barred sand bass
	4.	*P. clathratus*	kelp bass
	5.	*Sebastes serranoides*	olive rockfish
	6.	*Scomber japonicus*	Pacific mackerel
	7.	*Caulolatilus princeps*	ocean whitefish
	8.	*Paralabrax maculatofasciatus*	spotted sand bass
	9.	*Haliotis rufescens*	red abalone
	10.	*Pimelometopon pulchrum*	California sheephead
	11.	*Sebastes miniatus*	vermilion rockfish
	12.	*Haliotis fulgens*	green abalone
	13.	*Scorpaena guttata*	sculpin
	14.	*Sebastes chlorostictus*	greenspotted rockfish
	15.	*Sphyraena argentea*	California barracuda

TABLE 4. Estimated Catch and Effort Values for Anglers; July 1976 through June 1977.

Area	Santa Barbara & Ventura Co.	Los Angeles & Orange Co.	San Diego County	Total
Angler Parties				
weekend	11,303	52,501	16,509	80,313
weekday	3,078*	24,223	8,874*	36,175
Total	14,381	76,224	25,383	116,488
Angler Days				
weekend	29,563	143,694	44,310	217,567
weekday	6,899*	59,268	21,079*	87,246
Total	36,462	202,962	65,389	304,813
Angler Trip Hours				
weekend	190,617	952,624	333,041	1,476,282
weekday	41,787*	371,581	130,062*	543,430
Total	232,404	1,324,205	463,103	2,019,712
No. Fishes Landed				
weekend	101,795	309,571	97,374	508,740
weekday	19,161*	165,861	43,814*	228,836
Total	120,956	475,432	141,188	737,576
No. Rockfishes Landed				
weekend	66,362	77,557	27,205	171,124
weekday	10,500*	25,376	6,571*	42,447
Total	76,862	102,933	33,776	213,571
Anoplopoma fimbria (sablefish)	454*	3,023	704*	4,181
Caulolatilus princeps (ocean whitefish)	1,590*	9,836	4,388*	15,814
Citharichthys sordidus (Pacific sanddab)	3,698*	3,347	1,987*	9,032
Cynoscion nobilis (white seabass)	54*	1,990	536*	2,580
Embiotoca jacksoni (black surfperch)	437*	14,136	272*	14,845
Genyonemus lineatus (white croaker)	13,877*	165,382	26,601*	205,860

* No data were collected for weekdays during October 1976 through March 1977. Therefore the number indicated here does not include an estimate for this time period.

TABLE 4. - Cont.

Area:	Santa Barbara & Ventura Co.	Los Angeles & Orange Co.	San Diego County	Total
Girella nigricans (opaleye)	257*	6,169	503*	6,929
Medialuna californiensis (halfmoon)	211*	12,572	196*	12,979
Oncorhynchus tshawytscha (king salmon)	513*	64	0*	577
Ophiodon elongatus (lingcod)	1,384*	287	580*	2,251
Paralabrax clathratus (kelp bass)	7,484*	19,982	9,464*	36,930
P. maculatofasciatus (spotted sand bass)	117*	5,454	7,219*	12,790
P. nebulifer (barred sand bass)	534*	17,474	14,059*	32,067
Paralichthys californicus (California halibut)	1,192*	7,121	1,443*	9,756
Pimelometopon pulchrum (California sheephead)	956*	1,971	1,630*	4,557
Sarda chiliensis (Pacific bonito)	2,957*	40,947	13,634*	57,538
Scomber japonicus (Pacific mackerel)	2,648*	16,050	7,400*	26,098
Scorpaena guttata (sculpin)	860*	10,291	2,826*	13,977
Sebastes atrovirens (kelp rockfish)	3,969*	2,135	1,460*	7,564
S. auriculatus (brown rockfish)	4,620*	5,617	681*	10,918
S. caurinus (copper rockfish)	11,597*	1,457	763*	13,817
S. chlorostictus (greenspotted rockfish)	5,102*	3,731	2,432*	11,265
S. miniatus (vermilion rockfish)	4,401*	7,354	3,472*	15,227
S. mystinus (blue rockfish)	4,742*	7,220	1,632*	13,594
S. paucispinis (bocaccio)	7,021*	12,058	1,663*	20,742
S. serranoides (olive rockfish)	6,038*	18,385	6,411*	30,834
S. rastrelliger (grass rockfish)	3,371*	4,375	479*	8,225

* No data were collected for weekdays during October 1976 through March 1977. Therefore the number indicated here does not include an estimate for this time period.

TABLE 4. - Cont.

Area	Santa Barbara & Ventura Co.	Los Angeles & Orange Co.	San Diego County	Total
Sphyraena argentea (California barracuda)	11*	8,222	3,094*	11,327
Trachurus symmetricus (jack mackerel)	749*	3,159	701*	4,609

* No data were collected for weekdays during October 1976 through March 1977. Therefore the number indicated here does not include an estimate for this time period.

TABLE 5. Estimated Catch and Effort Values for Divers; July 1976 through June 1977.

Area	Santa Barbara & Ventura Co.	Los Angeles & Orange Co.	San Diego County	Total
Diver Parties				
weekend	1,409	1,811	1,765	4,985
weekday	191*	819	483*	1,493
Total	1,600	2,630	2,248	6,478
Diver Days				
weekend	3,808	4,528	4,609	12,945
weekday	497*	1,842	1,197*	3,536
Total	4,305	6,370	5,806	16,481
Diver-trip Hours				
weekend	24,797	22,439	20,591	67,827
weekday	3,332*	7,599	4,591*	15,522
Total	28,129	30,038	25,182	83,349
No. Organisms Landed				
weekend	18,034	11,697	14,611	44,342
weekday	3,291*	5,855	2,854*	12,000
Total	21,325	17,552	17,465	56,342
Haliotis corrugata (pink abalone)	1,990*	552	1,075*	3,617
H. cracherodii (black abalone)	565*	656	0*	1,221
H. fulgens (green abalone)	520*	1,673	3,832*	6,025
H. rufescens (red abalone)	3,625*	190	5,268*	9,083
Hinnites multirugosus (rock scallop)	5,198*	6,084	2,311*	13,593
Panulirus interruptus (California spiny lobster)	1,365*	1,475	341*	3,181
Paralabrax clathratus (kelp bass)	664*	847	414*	1,925
Pimelometopon pulchrum (California sheephead)	1,989*	988	998*	3,975

* No data were collected for weekdays during October 1976 through March 1977. Therefore the number indicated here does not include an estimate for this time period.

TABLE 6. Adjusted Catch and Effort Estimates.

Area	Santa Barbara and Ventura Co.	Los Angeles and Orange Co.	San Diego County	Total
Angler Parties				
weekend	11,303	52,501	16,509	80,313
weekday	4,448*	24,223	13,514*	42,185
Total	15,751	76,724	30,023	122,498
Diver Parties				
weekend	1,409	1,811	1,765	4,985
weekday	396*	819	862*	2,077
Total	1,805	2,630	2,627	7,062
Angler Days				
weekend	29,563	143,694	44,310	217,567
weekday	9,941*	59,268	31,673*	100,882
Total	39,504	202,962	75,983	318,449
Diver Days				
weekend	3,808	4,528	4,609	12,945
weekday	934*	1,842	2,022*	4,798
Total	4,742	6,370	6,631	17,743
Angler-trip-hours				
weekend	190,617	952,624	333,041	1,476,282
weekday	58,280*	371,581	187,079*	616,940
Total	248,897	1,324,205	520,120	2,093,222
Diver-trip-hours				
weekend	24,797	22,439	20,591	67,827
weekday	6,691*	7,599	6,475*	20,765
Total	31,488	30,038	27,066	88,592
No. Fishes Landed by Anglers				
weekend	101,795	309,571	97,374	508,740
weekday	25,980*	165,861	62,481*	254,322
Total	127,775	475,432	159,855	763,062
Anoplopoma fimbria (sablefish)	454*	3,023	711*	4,188
Cynoscion nobilis (white seabass)	54*	1,990	605*	2,649
Embiotoca jacksoni (black surfperch)	445*	14,136	272*	14,853
Genyonemus lineatus (white croaker)	14,258*	165,382	29,605*	209,245

* Adjusted estimate.

TABLE 6. - Cont.

Area	Santa Barbara and Ventura Co.	Los Angeles and Orange Co.	San Diego County	Total
Oncorhynchus tshawytscha (king salmon)	520*	64	0*	584
Ophiodon elongatus (lingcod)	1,600*	287	699*	2,586
Paralabrax clathratus (kelp bass)	7,675*	19,982	9,695*	37,352
P. maculatofasciatus (spotted sand bass	117*	5,454	7,961*	13,532
P. nebulifer (barred sand bass)	626*	17,474	17,246*	35,346
Paralichthys californicus (California halibut)	1,234*	7,121	1,715*	10,070
Sarda chiliensis (Pacific bonito)	2,977*	40,947	14,259*	58,183
Scomber japonicus (Pacific mackerel)	2,648*	16,050	7,999*	26,697
Scorpaena guttata (sculpin)	920*	10,291	3,392*	14,603
Sebastes auriculatus (brown rockfish)	6,948*	5,617	754*	13,319
S. caurinus (copper rockfish)	3,406*	1,457	779*	5,642
S. chlorostictus (greenspotted rockfish)	5,248*	3,731	3,162*	12,141
S. miniatus (vermilion rockfish)	4,726*	7,354	4,519*	16,599
S. mystinus (blue rockfish)	4,836*	7,220	1,809*	13,865
S. paucispinis (bocaccio)	7,398*	12,058	1,744*	21,200
S. serranoides (olive rockfish)	6,780*	18,385	8,241*	33,406
Sphyraena argentea (California barracuda)	11*	8,222	3,258*	11,491

* Adjusted estimate.

TABLE 7. Estimated Angler Catch-Per-Unit-of-Effort.

Area	Jul.-Sept.	Oct.-Dec.	Jan.-Mar.	Apr.-Jun.
Santa Barbara-Ventura County	0.60	0.70	0.42	0.38
Los Angeles-Orange County	0.34	0.45	0.38	0.32
San Diego County	0.28	0.31	0.35	0.32

TABLE 8. Estimated Diver Catch-Per-Unit-of-Effort.

Area	Jul.-Sept.	Oct.-Dec.	Jan.-Mar.	Apr.-Jun.
Santa Barbara-Ventura County	0.80	0.80	0.73	0.55
Los Angeles-Orange County	0.55	0.63	0.40	0.73
San Diego County	0.72	0.68	0.48	0.75

TABLE 9. Occurrence of Sub-legal Fishes in Examined Catch.

Scientific name	Common name	No. measured	legal	(last year's % legal)
	Fishes			
Cynoscion nobilis	white seabass	408	6.6	(6.4)
Oncorhynchus tshawytscha	king salmon	171	96.5	(99.0)
Paralabrax clathratus	kelp bass	7,239	85.4	(84.7)
P. maculatofasciatus	spotted sand bass	1,961	78.4	(76.5)
P. nebulifer	barred sand bass	4,970	89.1	(85.6)
Paralichthys californicus	California halibut	1,802	59.4	(57.3)
Sphyraena argentea	California barracuda	1,483	74.0	(64.1)
	Molluscs and Crustaceans			
Cancer antennarius	rock crab	71	90.1	(95.8)
Haliotis corrugata	pink abalone	1,044	94.2	(85.8)
H. cracherodii	black abalone	264	86.0	(100.0)
H. fulgens	green abalone	1,104	97.9	(97.2)
H. rufescens	red abalone	2,229	93.0	(88.4)
H. sorenseni	white abalone	64	98.4	(94.4)
Panulirus interruptus	Calif. spiny lobster	544	95.8	(96.6)

APPENDIX I

Effort Data and Most Commonly Landed Fishes at Each Sample Location

LOCATION: Gaviota

COUNTY: Santa Barbara

26 sample days

399 anglers

278 divers

2,517 angler-trip-hours

1,752 diver-trip-hours

3,870 fishes sampled

60 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Haliotis rufescens	red abalone	513	13
Sebastes atrovirens	kelp rockfish	474	12
Hinnites multirugosus	rock scallop	257	7
Sebastes caurinus	copper rockfish	230	6
S. auriculatus	brown rockfish	216	6
Scorpaenichthys marmoratus	cabezon	192	5
Citharichthys sordidus	Pacific sanddab	167	4
Panulirus interruptus	Calif. spiny lobster	136	4
Sebastes mystinus	blue rockfish	131	3
Ophiodon elongatus	lingcod	115	3
			63%

LOCATION: Goleta

COUNTY: Santa Barbara

46 sample days

1,192 anglers

109 divers

7,669 angler-trip-hours

563 diver-trip-hours

3,176 fishes sampled

75 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Paralabrax clathratus	kelp bass	389	12
Sebastes chlorostictus	greenspotted rockfish	317	10
S. paucispinis	bocaccio	223	7
S. atrovirens	kelp rockfish	210	7
S. rastrelliger	grass rockfish	200	6
Genyonemus lineatus	white croaker	197	6
Sebastes caurinus	copper rockfish	169	5
Sarda chiliensis	Pacific bonito	111	4
Sebastes miniatus	vermilion rockfish	110	4
S. auriculatus	brown rockfish	109	3
			64%

LOCATION: Santa Barbara

COUNTY: Santa Barbara

49 sample days

3,736 anglers

299 divers

24,100 angler-trip-hours

1,839 diver-trip-hours

10,657 fishes sampled

97 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Sebastes caurinus	copper rockfish	909	9
S. serranoides	olive rockfish	751	7
Scomber japonicus	Pacific mackerel	679	6
Paralabrax clathratus	kelp bass	671	6
Sebastes chlorostictus	greenspotted rockfish	664	6
Genyonemus lineatus	white croaker	607	6
Sarda chiliensis	Pacific bonito	577	6
Hinnites multirugosus	rock scallop	456	4
Sebastes miniatus	blue rockfish	353	3
S. paucispinis	bocaccio	333	3
			56%

LOCATION: Ventura

COUNTY: Ventura

49 sample days

1,822 anglers

178 divers

10,961 angler-trip-hours

1,231 diver-trip-hours

6,925 fishes sampled

86 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	1,579	23
Paralabrax clathratus	kelp bass	466	7
Sebastes serranoides	olive rockfish	464	7
S. caurinus	copper rockfish	415	6
S. auriculatus	brown rockfish	395	6
S. rastrelliger	grass rockfish	241	4
S. paucispinis	bocaccio	240	3
Hinnites multirugosus	rock scallop	223	3
Haliotis corrugata	pink abalone	215	3
Pimelometopon pulchrum	California sheephead	183	3
			64%

LOCATION: Oxnard

COUNTY: Ventura

48 sample days

4,474 anglers

537 divers

30,342 angler-trip-hours

3,796 diver-trip-hours

20,442 fishes sampled

123 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Sebastes caurinus	copper rockfish	2,169	11
S. paucispinis	bocaccio	1,492	7
Genyonemus lineatus	white croaker	1,400	7
Paralabrax clathratus	kelp bass	970	5
Sebastes mystinus	blue rockfish	961	5
Citharichthys sordidus	Pacific sanddab	843	4
Sebastes miniatus	vermilion rockfish	805	4
Hinnites multirugosus	rock scallop	757	4
Sebastes serranoides	olive rockfish	692	3
S. chlorostictus	greenspotted rockfish	657	3
			53%

LOCATION: Paradise Cove

COUNTY: Los Angeles

36 sample days

1,967 anglers

74 divers

13,864 angler-trip-hours

378 diver-trip-hours

6,461 fishes sampled

96 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	1,381	21
Sebastes serranoides	olive rockfish	564	9
Paralabrax clathratus	kelp bass	555	9
Sebastes atrovirens	kelp rockfish	507	8
S. rastrelliger	grass rockfish	481	7
S. paucispinis	bocaccio	418	6
Hinnites multirugosus	rock scallop	243	4
Sebastes caurinus	copper rockfish	191	3
Paralichthys californicus	California halibut	183	3
Sebastes miniatus	vermilion rockfish	143	2
			72%

LOCATION: Marina del Rey

COUNTY: Los Angeles

49 sample days

4,090 anglers

82 divers

27,049 angler-trip-hours

511 diver-trip-hours

9,233 fishes sampled

101 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	2,234	24
Sarda chiliensis	Pacific bonito	954	10
Sebastes paucispinis	bocaccio	747	8
S. chlorostictus	greenspotted rockfish	364	4
Anoplopoma fimbria	sablefish	349	4
Paralabrax clathratus	kelp bass	337	4
Sebastes serranoides	olive rockfish	328	4
Paralabrax nebulifer	barred sand bass	313	3
Sebastes rosenblatti	greenblotched rockfish	295	3
Paralichthys californicus	California halibut	279	3
			67%

LOCATION: Redondo Hoist

COUNTY: Los Angeles

28 sample days

2,031 anglers

134 divers

12,824 angler-trip-hours

610 diver-trip-hours

4,034 fishes sampled

57 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Sarda chiliensis	Pacific bonito	1,097	27
Hinnites multirugosus	rock scallop	268	7
Caulolatilus princeps	ocean whitefish	260	6
Sebastes paucispinis	bocaccio	253	6
Scomber japonicus	Pacific mackerel	251	6
Sebastes mystinus	blue rockfish	201	5
S. serranoides	olive rockfish	170	4
Paralabrax clathratus	kelp bass	162	4
Medialuna californiensis	halfmoon	139	4
Sebastes auriculatus	brown rockfish	100	3
			72%

LOCATION: Redondo Rental

COUNTY: Los Angeles

30 sample days

2,182 anglers

10 divers

13,930 angler-trip-hours

37 diver-trip-hours

2,073 fishes sampled

56 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Sarda chiliensis	Pacific bonito	977	47
Scomber japonicus	Pacific mackerel	568	27
Genyonemus lineatus	white croaker	61	3
Paralabrax maculatofasciatus	spotted sand bass	35	2
Sphyraena argentea	Calif. barracuda	33	2
Hinnites multirugosus	rock scallop	32	2
Atherinops affinis	topsmelt	31	1
Paralichthys californicus	California halibut	31	1
Squalus acanthias	spiny dogfish	28	1
Paralabrax clathratus	kelp bass	27	1
			87%

LOCATION: Cabrillo Beach

COUNTY: Los Angeles

36 sample days

2,694 anglers

109 divers

16,796 angler-trip-hours

586 diver-trip-hours

15,277 fishes sampled

105 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	9,041	59
Sebastes serranoides	olive rockfish	632	4
Embiotoca jacksoni	black surfperch	482	3
Paralabrax clathratus	kelp bass	440	3
Scorpaena guttata	sculpin	399	3
Medialuna californiensis	halfmoon	378	3
Caulolatilus princeps	ocean whitefish	339	2
Sebastes auriculatus	brown rockfish	282	2
S. mystinus	blue rockfish	244	2
Paralabrax nebulifer	barred sand bass	217	1
			82%

LOCATION: Golden Shore

COUNTY: Los Angeles

37 sample days

3,062 anglers

57 divers

19,882 angler-trip-hours

301 diver-trip-hours

11,059 fishes sampled

94 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	5,216	47
Embiotoca jacksoni	black surfperch	804	7
Sebastes serranoides	olive rockfish	450	4
Caulolatilus princeps	ocean whitefish	404	4
Medialuna californiensis	halfmoon	389	4
Scorpaena guttata	sculpin	302	3
Paralabrax nebulifer	barred sand bass	280	3
Girella nigricans	opaleye	250	2
Sarda chiliensis	Pacific bonito	246	2
Paralabrax clathratus	kelp bass	240	2
			78%

LOCATION: Marine Stadium

COUNTY: Los Angeles

40 sample days

5,058 anglers

93 divers

34,566 angler-trip-hours

559 diver-trip-hours

10,860 fishes sampled

102 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	4,038	37
Sarda chiliensis	Pacific bonito	667	6
Sebastes serranoides	olive rockfish	571	5
Paralabrax nebulifer	barred sand bass	478	5
Scomber japonicus	Pacific mackerel	467	4
Paralabrax clathratus	kelp bass	457	4
Embiotoca jacksoni	black surfperch	319	3
Scorpaena guttata	sculpin	310	3
Medialuna californiensis	halfmoon	307	3
Sebastes paucispinis	bocaccio	286	3
			73%

LOCATION: Sunset Aquatic Park

COUNTY: Orange

30 sample days

1,467 anglers

25 divers

9,888 angler-trip-hours

163 diver-trip-hours

2,871 fishes sampled

80 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	746	26
Sarda chiliensis	Pacific bonito	209	7
Paralabrax nebulifer	barred sand bass	132	5
Scorpaena guttata	sculpin	129	5
Embiotoca jacksoni	black surfperch	127	4
Sebastes serranoides	olive rockfish	115	4
Paralabrax clathratus	kelp bass	104	4
Citharichthys sordidus	Pacific sanddab	103	4
Sebastes miniatus	vermilion rockfish	96	3
Scomber japonicus	Pacific mackerel	91	3
			65%

LOCATION: Art's Landing

COUNTY: Orange

32 sample days

1,071 anglers

1 diver

7,210 angler-trip-hours

3 diver-trip-hours

1,196 fishes sampled

46 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Paralabrax maculatofasciatus	spotted sand bass	359	30
Embiotoca jacksoni	black surfperch	105	9
Roncador stearnsii	spotfin croaker	103	9
Phanerodon furcatus	white surfperch	94	8
Paralabrax nebulifer	barred sand bass	90	7
Genyonemus lineatus	white croaker	81	7
Hypsopsetta guttulata	diamond turbot	48	4
Seriphus politus	queenfish	30	2
Paralichthys californicus	California halibut	28	2
Umbrina roncador	yellowfin croaker	24	2
			80%

LOCATION: Bayside

COUNTY: Orange

34 sample days

2,020 anglers

63 divers

13,411 angler-trip-hours

287 diver-trip-hours

2,288 fishes sampled

81 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	579	25
Sarda chiliensis	Pacific bonito	151	7
Paralabrax nebulifer	barred sand bass	125	6
Embiotoca jacksoni	black surfperch	123	5
Paralabrax clathratus	kelp bass	104	5
P. maculatofasciatus	spotted sand bass	101	4
Synodus lucioceps	lizardfish	75	3
Medialuna californiensis	halfmoon	63	3
Hinnites multirugosus	rock scallop	60	3
Scomber japonicus	Pacific mackerel	56	2
			63%

LOCATION: Newport Dunes

COUNTY: Orange

35 sample days

1,509 anglers

33 divers

10,494 angler-trip-hours

225 diver-trip-hours

1,739 fishes sampled

80 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	394	22
Sarda chiliensis	Pacific bonito	180	10
Paralabrax clathratus	kelp bass	115	7
P. nebulifer	barred sand bass	70	4
Embiotoca jacksoni	black surfperch	67	4
Paralabrax maculatofasciatus	spotted sand bass	58	3
Sebastes miniatus	vermilion rockfish	50	3
S. serranoides	olive rockfish	47	3
S. goodei	chilipepper	43	2
Synodus lucioceps	Calif. lizardfish	41	2
			60%

LOCATION: Dana Pt. Launch

COUNTY: Orange

46 sample days

7,281 anglers

347 divers

48,427 angler-trip-hours

1,437 diver-trip-hours

10,173 fishes sampled

118 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Sarda chiliensis	Pacific bonito	1,508	15
Genyonemus lineatus	white croaker	1,490	15
Paralabrax clathratus	kelp bass	1,093	11
P. nebulifer	barred sand bass	940	9
Sphyraena argentea	California barracuda	910	9
Scorpaena guttata	sculpin	281	3
Hinnites multirugosus	rock scallop	235	2
Sebastes goodei	chilipepper	220	2
S. paucispinis	bocaccio	213	2
Seriphus politus	queenfish	200	2
			70%

LOCATION: Dana Pt. Hoist

COUNTY: Orange

14 sample days

324 anglers

17 divers

1,847 angler-trip-hours

47 diver-trip-hours

524 fishes sampled

40 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	178	34
Sarda chiliensis	Pacific bonito	114	22
Paralabrax nebulifer	barred sand bass	44	8
P. clathratus	kelp bass	34	6
Sebastes serranoides	olive rockfish	16	3
Haliotis fulgens	green abalone	11	2
Sebastes paucispinis	bocaccio	11	2
Pimelometopon pulchrum	California sheephead	10	2
Sebastes rastrelliger	grass rockfish	8	2
Cynoscion nobilis	white seabass	7	1
			82%

LOCATION: Oceanside

COUNTY: San Diego

56 sample days

2,513 anglers

61 divers

16,646 angler-trip-hours

311 diver-trip-hours

5,191 fishes sampled

90 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	1,561	30
Paralabrax clathratus	kelp bass	696	13
Sarda chiliensis	Pacific bonito	581	11
Paralabrax nebulifer	barred sand bass	300	6
Sebastes chlorostictus	greenspotted rockfish	134	3
Synodus lucioceps	California lizardfish	130	3
Sebastes paucispinis	bocaccio	116	2
Pimelometopon pulchrum	California sheephead	100	2
Scomber japonicus	Pacific mackerel	97	2
Sebastes miniatus	vermilion rockfish	92	1
			73%

LOCATION: Ski Beach

COUNTY: San Diego

38 sample days

1,384 anglers

230 divers

10,324 angler-trip-hours

1,013 diver-trip-hours

4,161 fishes sampled

94 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Sarda chiliensis	Pacific bonito	364	9
Sebastes serranoides	olive rockfish	311	7
Paralabrax clathratus	kelp bass	274	7
Scomber japonicus	Pacific mackerel	259	6
Caulolatilus princeps	ocean whitefish	243	6
Sphyraena argentea	California barracuda	160	4
Paralabrax nebulifer	barred sand bass	133	3
Citharichthys sordidus	Pacific sanddab	130	3
Haliotis rufescens	red abalone	125	3
Sebastes miniatus	vermilion rockfish	117	3
			51%

LOCATION: Dana Basin

COUNTY: San Diego

50 sample days

4,629 anglers

559 divers

32,681 angler-trip-hours

2,480 diver-trip-hours

11,311 fishes sampled

101 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Sarda chiliensis	Pacific bonito	1,283	11
Scomber japonicus	Pacific mackerel	1,093	10
Sebastes serranoides	olive rockfish	588	5
Caulolatilus princeps	ocean whitefish	581	5
Paralabrax clathratus	kelp bass	551	5
Haliotis rufescens	red abalone	502	5
Pimelometopon pulchrum	California sheephead	369	3
Sebastes miniatus	vermilion rockfish	339	3
Paralabrax nebulifer	barred sand bass	336	3
Sphyraena argentea	California barracuda	316	3
			53%

LOCATION: Shelter Island

COUNTY: San Diego

29	sample days
3,765	anglers
379	divers
29,817	angler-trip-hours
1,608	diver-trip-hours
10,089	fishes sampled
101	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	2,403	24
Paralabrax nebulifer	barred sand bass	1,219	12
P. maculatofasciatus	spotted sand bass	624	6
Sarda chiliensis	Pacific bonito	614	6
Thunnus alalunga	albacore	570	6
Paralabrax clathratus	kelp bass	432	4
Haliotis rufescens	red abalone	395	4
H. fulgens	green abalone	334	3
Sebastes serranoides	olive rockfish	289	3
Scorpaena guttata	sculpin	209	2
			70%

LOCATION: Glorietta Bay

COUNTY: San Diego

45 sample days

788 anglers

59 divers

5,240 angler-trip-hours

299 diver-trip-hours

20,064 fishes sampled

66 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	383	19
Paralabrax nebulifer	barred sand bass	269	13
Sebastes serranoides	olive rockfish	159	8
Paralabrax maculatofasciatus	spotted sand bass	155	7
P. clathratus	kelp bass	126	6
Caulolatilus princeps	ocean whitefish	104	5
Sarda chiliensis	Pacific bonito	95	5
Haliotis rufescens	red abalone	85	4
Pimelometopon pulchrum	California sheephead	72	3
Scorpaena guttata	sculpin	54	3
			73%

LOCATION: Chula Vista

COUNTY: San Diego

36 sample days

481 anglers

8 divers

3,179 angler-trip-hours

35 diver-trip-hours

998 fishes sampled

63 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Sebastes serranoides	olive rockfish	144	14
Paralabrax nebulifer	barred sand bass	133	13
P. maculatofasciatus	spotted sand bass	115	12
Genyonemus lineatus	white croaker	102	10
Sebastes umbrosus	honeycomb rockfish	37	4
S. mystinus	blue rockfish	37	4
Caulolatilus princeps	ocean whitefish	35	4
Sebastes miniatus	vermilion rockfish	30	3
Paralabrax clathratus	kelp bass	26	3
Sebastes paucispinis	bocaccio	25	2
			69%

LOCATION: National City

COUNTY: San Diego

26 sample days

663 anglers

40 divers

4,685 angler-trip-hours

173 diver-trip-hours

1,934 fishes sampled

66 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	414	22
Paralabrax nebulifer	barred sand bass	324	17
Sebastes serranoides	olive rockfish	140	7
Paralabrax maculatofasciatus	spotted sand bass	121	6
Caulolatilus princeps	ocean whitefish	99	5
Scorpaena guttata	sculpin	88	5
Hinnites multirugosus	rock scallop	52	3
Paralabrax clathratus	kelp bass	48	2
Citharichthys sordidus	Pacific sanddab	48	2
Sebastes miniatus	vermilion rockfish	43	2
			71%

LOCATION: De Anza

COUNTY: San Diego

27 sample days

396 anglers

92 divers

2,700 angler-trip-hours

448 diver-trip-hours

941 fishes sampled

67 species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Protothaca staminea	common littleneck	100	10
Haliotis rufescens	red abalone	92	10
Sebastes serranoides	olive rockfish	57	6
Citharichthys sordidus	Pacific sanddab	55	6
Strongylocentrotus franciscanus	red urchin	44	5
Hinnites multirugosus	rock scallop	39	4
Roncador stearnsii	spotfin croaker	36	4
Haliotis fulgens	green abalone	33	3
Genyonemus lineatus	white croaker	28	3
Scomber japonicus	Pacific mackerel	26	3
			54%

APPENDIX II

Standard Error of the Angler Estimates

Angler Estimates

Santa Barbara-Ventura Counties

	Weekdays*		Weekends		Total	
	Estimate	Std. Err.	Estimate	Std. Err.	Estimate	Std. Err.
Angling Parties	3,078	566	11,303	378	14,381	680
Anglers	6,899	1,292	29,563	1,042	36,462	1,660
Angler Hours	41,787	8,389	190,617	7,662	232,404	11,361
Total Fishes Landed	19,161	3,489	101,795	4,246	120,956	5,946
Rockfishes Landed	10,500	2,128	66,362	3,250	76,862	3,885
sablefish	160	93	294	77	454	121
ocean whitefish	25	18	1,565	118	1,590	119
Pacific sanddab	581	308	3,117	340	3,698	459
white seabass	29	29	25	5	54	29
black surfperch	33	24	404	44	437	50
white croaker	3,946	1,484	9,931	490	13,877	1,563
opaleye	0	0	257	34	257	34
halfmoon	0	0	211	26	211	26
king salmon	204	204	309	60	513	213
lingcod	289	117	1,095	66	1,384	134
kelp bass	1,328	353	6,156	337	7,484	488
spotted sand bass	108	108	9	3	117	108
barred sand bass	179	88	355	37	534	95
halibut	305	169	887	66	1,192	181
sheephead	33	24	923	83	956	86
bonito	315	201	2,642	405	2,957	452
Pacific mackerel	26	26	2,622	535	2,648	536
sculpin	201	116	659	84	860	143
kelp rockfish	995	530	2,974	220	3,969	574
brown rockfish	1,152	447	3,468	312	4,620	545
copper rockfish	1,516	408	10,081	602	11,597	727
greenspotted rockfish	278	146	4,824	282	5,102	318
vermilion rockfish	371	115	4,030	286	4,401	308
blue rockfish	301	152	4,441	431	4,742	457
bocaccio	905	357	6,116	506	7,021	619
olive rockfish	791	306	5,247	410	6,038	512
grass rockfish	1,084	338	2,287	113	3,371	356
California barracuda	0	0	11	4	11	4
jack mackerel	47	47	702	112	749	121

* This estimate is for July through September 1976 and April through June 1977. No data was collected from October 1976 to March 1977.

Angler Estimates

LA/Orange Counties

	Weekdays		Weekends		Total	
	Estimate	Std. Err.	Estimate	Std. Err.	Estimate	Std. Err.
Angling Parties	24,223	1,386	52,501	1,603	76,724	2,120
Anglers	59,268	3,629	143,694	4,646	202,962	5,895
Angler Hours	371,581	23,287	952,624	32,102	1,324,205	39,659
Total Fishes Landed	165,861	15,551	309,571	14,108	475,432	20,997
Rockfishes Landed	25,376	3,121	77,557	4,205	102,933	5,236
sablefish	914	281	2,109	299	3,023	411
ocean whitefish	1,806	702	8,030	1,068	9,836	1,278
Pacific sanddab	737	443	2,610	449	3,347	631
white seabass	712	188	1,278	212	1,990	283
black surfperch	4,686	1,100	9,450	1,065	14,136	1,531
white croaker	72,263	11,072	93,119	8,043	165,382	13,685
opaleye	3,194	1,538	2,975	583	6,169	1,644
halfmoon	5,737	1,853	6,835	852	12,572	2,040
king salmon	17	17	47	7	64	18
lingcod	63	29	224	45	287	53
kelp bass	5,321	868	14,661	1,198	19,982	1,480
spotted sand bass	2,689	707	2,765	409	5,454	817
barred sand bass	4,732	661	12,742	1,206	17,474	1,375
halibut	2,712	479	4,409	301	7,121	566
sheephead	240	109	1,731	171	1,971	202
bonito	14,200	3,037	26,747	3,406	40,947	4,563
Pacific mackerel	4,210	1,488	11,840	1,555	16,050	2,152
sculpin	2,618	408	7,673	708	10,291	817
kelp rockfish	364	156	1,771	368	2,135	400
brown rockfish	1,627	370	3,990	313	5,617	485
copper rockfish	314	188	1,143	153	1,457	242
greenspotted rockfish	674	212	3,057	425	3,731	475
vermilion rockfish	1,288	277	6,066	603	7,354	663
blue rockfish	2,107	731	5,113	510	7,220	891
bocaccio	2,165	521	9,893	807	12,058	961
olive rockfish	5,312	1,026	13,073	1,021	18,385	1,448
grass rockfish	1,312	316	3,063	323	4,375	452
California barracuda	1,699	1,051	6,523	4,075	8,222	4,208
jack mackerel	1,901	1,121	1,258	196	3,159	1,138

Angler Estimates

San Diego County

	Weekdays*		Weekends		Total	
	Estimate	Std. Err.	Estimate	Std. Err.	Estimate	Std. Err.
Angling Parties	8,874	1,161	16,509	887	25,383	1,461
Anglers	21,079	2,854	44,310	2,371	65,389	3,710
Angler Hours	130,062	19,850	333,041	18,905	463,103	27,412
Total Fishes Landed	43,814	7,293	97,374	6,134	141,188	9,530
Rockfishes Landed	6,571	1,137	27,205	1,920	33,776	2,231
sablefish	15	15	689	137	704	138
ocean whitefish	331	152	4,057	469	4,388	493
Pacific sanddab	29	19	1,958	312	1,987	313
white seabass	184	100	352	44	536	109
black surfperch	10	9	262	73	272	74
white croaker	11,358	2,880	15,243	1,513	26,601	3,253
opaleye	0	0	503	139	503	139
halfmoon	0	0	196	65	196	65
king salmon	0	0	0	0	0	0
lingcod	207	96	373	59	580	113
kelp bass	3,520	702	5,944	417	9,464	817
spotted sand bass	3,032	703	4,187	634	7,219	947
barred sand bass	6,083	1,426	7,976	888	14,059	1,680
halibut	578	172	865	82	1,443	191
sheephead	251	73	1,379	150	1,630	167
bonito	4,931	1,034	8,703	1,196	13,634	1,581
Pacific mackerel	1,773	623	5,627	1,341	7,400	1,479
sculpin	704	226	2,122	195	2,826	298
kelp rockfish	392	156	1,068	168	1,460	229
brown rockfish	186	117	495	100	681	154
copper rockfish	84	45	679	81	763	93
greenspotted rockfish	523	245	1,909	228	2,432	335
vermilion rockfish	1,125	330	2,347	248	3,472	413
blue rockfish	146	55	1,486	160	1,632	169
bocaccio	253	98	1,410	177	1,663	202
olive rockfish	1,536	464	4,875	394	6,411	609
grass rockfish	123	66	356	55	479	86
California barracuda	1,175	450	1,919	357	3,094	574
jack mackerel	25	18	676	157	701	158

* This estimate is for July through September 1976 and April through June 1977. No data was collected from October 1976 to March 1977.

APPENDIX III

Standard Error of the Diver Estimates

Diver Estimates

Santa Barbara-Ventura Counties

	Weekdays*		Weekends		Total	
	Estimate	Std. Err.	Estimate	Std. Err.	Estimate	Std. Err.
Diving Parties	191	56	1,409	55	1,600	78
Divers	497	158	3,808	161	4,305	226
Diver Hours	3,332	1,167	24,797	1,219	28,129	1,688
Total Fishes Landed	3,291	1,656	18,034	922	21,325	1,895
Rockfishes Landed	711	603	1,333	122	2,044	615
pink abalone	74	53	1,916	176	1,990	184
black abalone	0	0	565	80	565	80
green abalone	29	20	491	135	520	136
red abalone	833	469	2,792	271	3,625	542
rock scallop	413	239	4,785	416	5,198	480
lobster	0	0	1,365	84	1,365	84
kelp bass	55	42	609	61	664	42
sheephead	319	237	1,670	167	1,989	290

* This estimate is for July through September 1976 and April through June 1977. No data were collected from October 1976 to March 1977.

Diver Estimates

Los Angeles-Orange Counties

	Weekdays		Weekends		Total	
	Estimate	Std. Err.	Estimate	Std. Err.	Estimate	Std. Err.
Diving Parties	819	223	1,811	129	2,630	258
Divers	1,842	552	4,528	332	6,370	644
Diver Hours	7,599	2,361	22,439	1,593	30,038	2,848
Total Fishes Landed	5,855	2,126	11,697	983	17,552	2,342
Rockfishes Landed	41	27	402	85	443	89
pink abalone	87	53	465	97	552	111
black abalone	150	125	506	262	656	290
green abalone	81	53	1,592	315	1,673	319
red abalone	68	68	122	39	190	78
rock scallop	1,878	1,274	4,206	592	6,084	1,405
lobster	901	773	574	120	1,475	782
kelp bass	238	116	609	74	847	138
sheephead	191	95	797	92	988	132

Diver Estimates

San Diego County

	Weekdays*		Weekends		Total	
	Estimate	Std. Err.	Estimate	Std. Err.	Estimate	Std. Err.
Diving Parties	483	109	1,765	139	2,248	177
Divers	1,197	274	4,609	356	5,806	449
Diver Hours	4,591	1,085	20,591	1,792	25,182	2,095
Total Fishes Landed	2,854	790	14,611	1,452	17,465	1,653
Rockfishes Landed	32	21	808	107	840	109
pink abalone	120	60	955	140	1,075	152
black abalone	0	0	0	0	0	0
green abalone	1,228	448	2,604	302	3,832	540
red abalone	1,014	325	4,254	404	5,268	518
rock scallop	56	56	2,255	339	2,311	344
lobster	0	0	341	62	341	62
kelp bass	114	96	300	58	414	112
sheephead	43	25	955	205	998	207

* This estimate is for July through September 1976 and April through June 1977. No data were collected from October 1976 to March 1977.